CURRENT HOUSING RESEARCH

Social, Economic and Technical Research

Volume 14,
Number 2
Winter 2007-2008

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HOME TO CANADIANS

CMHC—HOME TO CANADIANS

Canada Mortgage and Housing Corporation (CMHC) has been Canada's national housing agency for more than 60 years.

Together with other housing stakeholders, we help ensure that Canada maintains one of the best housing systems in the world. We are committed to helping Canadians access a wide choice of quality, affordable homes, while making vibrant, healthy communities and cities a reality across the country.

For more information, visit our website at **www.cmhc.ca**

You can also reach us by phone at 1-800-668-2642
or by fax at 1-800-245-9274.

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CURRENT
HOUSING
RESEARCH

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Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***

INTRODUCTION

Under Part IX of the National Housing Act, the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced two times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's web site at http://www.cmhc-schl.gc.ca/en/corp/li/horetore/horetore_004.cfm

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "Completed Report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

ACQUIRING THE PUBLICATIONS AND REPORTS CITED AS COMPLETED

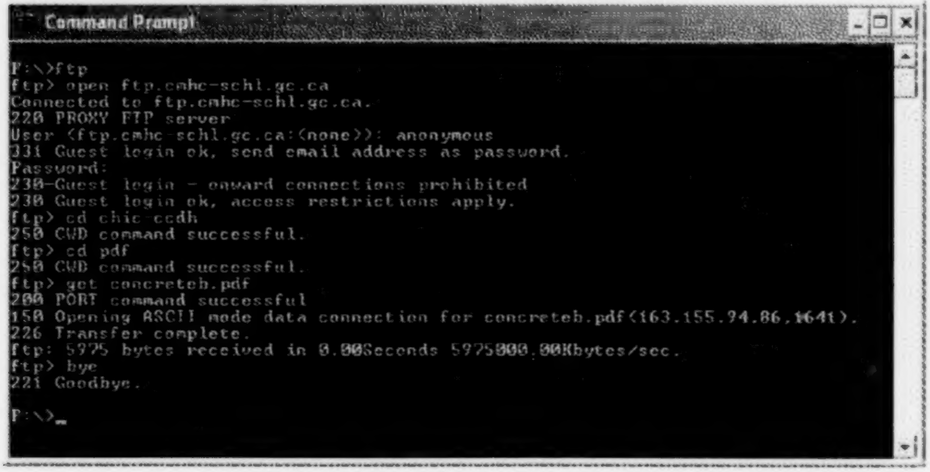
The availability section of each completed entry indicates the contact to obtain the item and whether the item can also be found on the Internet. Most items are available from the Canadian Housing Information Centre and can be ordered by using the information on the order form on the next page. We accept orders by regular mail, fax, phone, and via the Internet.

A number of the items cited are available electronically and the URL is included in the listing. CMHC uses an FTP (File Transfer Protocol) server to distribute reports. FTP has been used on the Internet as a means of transferring files between servers and users for many years and it continues to enjoy very wide use today.

In order to access a file using FTP, software with FTP capabilities is required and there are 3 types of FTP software:

1. Command Line FTP - FTP commands can be entered from a Command line or "DOS Prompt" on all Windows PCs.
2. FTP Client - a purpose built application to connect to FTP servers. These are widely available as commercial products or as shareware or even freeware on the Internet.
3. Some (not all) web browsers - Internet Explorer and Netscape can be used to access FTP files. They use correct protocol when ftp:// is entered in the address bar of the browser. Example: **ftp:**//ftp.cmhc-schl.gc.ca/

Here is an example of using the command line to retrieve a file from FTP.
FTP commands and help are available on PCs



```
F:\>ftp
ftp> open ftp.cmhc-schl.gc.ca
Connected to ftp.cmhc-schl.gc.ca.
220 PROXY FTP server
User (ftp.cmhc-schl.gc.ca:(none)): anonymous
331 Guest login ok, send email address as password.
Password:
230-Guest login - onward connections prohibited
230 Guest login ok, access restrictions apply.
ftp> cd chic-ccdh
250 CWD command successful.
ftp> cd pdf
250 CWD command successful.
ftp> get concreteb.pdf
200 PORT command successful
150 Opening ASCII mode data connection for concreteb.pdf(163.155.94.86,1641).
226 Transfer complete.
ftp: 5975 bytes received in 0.00Seconds 5975000.00Kbytes/sec.
ftp> bye
221 Goodbye.

F:\>_
```

CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or research highlights listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa ON K1A 0P7
Fax (613) 748-4069
Telephone 1-800-668-2642
Email: chic@cmhc-schl.gc.ca

COMPLETED REPORTS REQUESTED

☐ Send copies of above reports, research highlights

☐ Add my name to your mailing list to receive *Current Housing Research*

Name		
Mailing Address (please include e-mail)		
City	Province	Postal Code

CMHCS EXTERNAL RESEARCH PROGRAM

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and non-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made annually to support research investigations into important questions, problems, and issues affecting Canadian housing. CMHC is interested in receiving applications on topics related to existing CMHC housing research.

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or under-graduate level are not eligible to apply. Students may be hired to assist in conducting the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must apply as a private consultant, and the proposed research must not be part of, or interfere with his/her regular work. CMHC employees are not eligible to receive grants under this Program.

To obtain the Guidelines and Application Form (product #62964):

- visit our Web site at http://www.cmhc-schl.gc.ca;
- e-mail: erp@cmhc-schl.gc.ca; or
- call 1 800 668-2642.

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TECHNICAL RESEARCH

BASEMENT WALL INSULATION RETROFIT MONITORING

There have been field observations and research findings in the last several years which suggest that polyethylene as a vapour barrier in many wall assemblies may be overkill, and that other vapour retarder systems may be preferable. The last CMHC research showed that the below-grade portion of interior insulated basement wall assemblies might benefit from more permeability, not less. Various interior insulated assemblies have been suggested as alternatives. This project will measure the moisture performance of different basement interior insulation wall assemblies in 10 real houses to see if the research findings can be substantiated in the field, and to look out for unexpected repercussions in changing the current wall construction practice.

CMHC Project Officer **:** *Don Fugler*

CIDN : 36970200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

NEW

ECONOMIC ASSESSMENT OF BASEMENT SYSTEM INSULATION OPTIONS

This study updates the 1999 research, the Economic Assessment of Basement Systems, and is part of Performance Guidelines for Basement Envelope Systems and Materials, a joint project of Canada Mortgage and Housing Corporation (CMHC) and the National Research Council's (NRC) Institute for Research in Construction (IRC).

CMHC commissioned this study to update the economic assessment of residential basement insulation options to more accurately reflect the rising costs of basement construction and space-heating energy.

The study's primary objectives were: 1. To update material and labour construction costs for various types of basement systems available in the Canadian housing market; 2. To update energy prices and energy-price escalation rates to take into account expected trends in energy prices; 3. To include a larger basement model to accompany the smaller basement model used in the original study so that the effect of basement size could be compared; 4. To conduct a life-cycle economic assessment taking into account updated construction costs, energy prices and energy-price escalation rates; and 5. To prepare a report on the findings.

Prepared by Ted Kesik of Knowledge Mapping Inc. CMHC Project Manager: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2006. 74 pages (2102 KB)

Note: No. 07-103 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65346)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Economicbasement.pdf

FROST PROTECTED FOUNDATION MONITORING PERFORMANCE FOR RESIDENTIAL USES IN NORTHERN QUÉBEC, CHISASIBI PILOT PROJECT

This external research project will monitor the performance of a frost protected shallow foundation in a harsh northern Quebec climate setting. The project will provide in-situ measured data on the performance of this type of residential foundation with in-slab-radiant-floor heating. Results will be analysed to evaluate potential improvements to insulation levels and placement and will provide guidance for builders and designers. This project should be completed by March 2008.

CMHC Project Officer **:** *Ken Ruest*

CIDN : 28920210

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

BASEMENTS, FOUNDATIONS & CRAWLSPACES

RETROFITTING CRAWL SPACES - FIRST NATIONS DEMONSTRATION

The project will involve the retrofitting of several wet crawl spaces. The retrofits will be well-documented (e.g. video) and monitored for a period afterwards to verify effectiveness. The case studies will be used to demonstrate how to fix poorly performing crawl spaces. One demonstration may show inexpensive ways to lift existing houses and retrofit a better crawl space or basement underneath. Other possibilities include crawl space floor regrading, the use of exhaust fans to isolate problem crawl spaces, external utility buildings instead of basements, etc. The project has been prepared in conjunction with First Nations housing authorities and responds to a pressing problem found on many reserves. Completion is expected in 2009.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33050200
STATUS : Ongoing

See also: DEVELOPMENT AND ASSESSMENT OF CRAWL SPACE REMEDIATION STRATEGIES, p. 45

BUILDING CODES

CODE REQUIREMENTS AND COST OF INCORPORATING ACCESSORY APARTMENTS IN HOUSES: FINAL REPORT

Accessory apartments are an affordable housing option that meets the needs of many people, including singles, seniors and those with low or fixed incomes, and contributes to optimizing the use of existing housing stock and infrastructure. In order to improve housing affordability, several municipalities have enacted zoning changes that facilitate the provision of accessory apartments. Provincial, Territorial and Municipal building codes have different requirements for this form of housing, with the result that different regulations apply to accessory apartments in many Canadian municipalities.

This research comprises a literature review and consolidation and organization of documents regulating accessory apartments in Canada, evaluates the levels of performance provided by the various building code health and safety requirements and compares them with objectives of the National Building Code, to enable building authorities to assess proposed amendments to building and fire codes. It compares the costs of complying with regulations in different jurisdictions for the construction of a typical basement accessory apartment. Specifically, this research:

1. Lists National Building Code (NBC) and National Fire Code (NFC) provisions governing houses containing one principle residence and one accessory apartment that are distinct from the requirements for a single dwelling. It includes requirements for fire separations, egress, windows, sound control, clearances, heating and ventilation, smoke detection, fire alarms and protected openings;
2. Identifies provincial, territorial and municipal building and fire code requirements that differ from those in the NBC and NFC;
3. Categorizes code requirements in tabular form, with references and exact wording;
4. Evaluates the relative level of performance of the various municipal building and fire code requirements for accessory apartments, compared with the NBC requirements,
5. Proposes means for achieving equivalent levels of performance;
6. Summarizes code requirements in plain English; and
7. Estimates the costs of complying with each code requirement for a typical 60m2 basement accessory apartment in existing and new construction.

Prepared by Morrison Hershfield Limited. CMHC Project Officer: Barry Craig. Ottawa: Canada Mortgage and Housing Corporation, 2006. 106 pages (3254 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/codeaccessory.pdf

COMPLYING WITH RESIDENTIAL VENTILATION REQUIREMENTS IN THE 2005 NATIONAL BUILDING CODE

The objective of this project was to update the existing CMHC publication, "Complying with Residential Ventilation Requirements in the 1995 National Building Code (NBC)" to reflect the ventilation requirement changes which are included in the 2005 NBC. This publication will provide builders and renovators with an illustrated explanation to describe and clarify what ventilation options can be used to comply with the 2005 National Building Code. A consultant revised the text to incorporate results from recent research and improved house construction techniques. A group of home builders reviewed the text and illustrations were redrawn. The document is complete, but conflicting code requirements discovered during the research must be reconciled prior to publication. CMHC will attempt to resolve some of these conflicts with code officials before issuing the publication.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 35620200

STATUS : Ongoing

DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES

Under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC), CMHC contributed to a partnership of National Building Code stakeholders to develop transitional training material for the objective-based codes which includes pilot testing. Content provides for training on the structure, and new information included in the 2005 objective-based code, on the evaluation of alternative solutions allowed under objective-based codes (for example, using sprinklers in lieu of fire separations), on assessment criteria to allow for transferability of alternatives and their impact on other code requirements, on preparation of knowledge tests, on development of an instructor's guide, and on pilot testing. As provincial, territorial and municipal code enforcement officials have the most comprehensive information requirements, material was developed at their level and then adapted for other stakeholder groups to meet their needs. Training material has been developed in this multi-year project. The training material is prepared in three delivery modes: Basic Awareness, Independent Learning, and Classroom/Workshop, for delivery by instructors/facilitators.

STATUS : Completed

AVAILABILITY : Seminars are the property of National Research Council of Canada

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. A new draft of the document is available, but some technical and terminology questions have yet to be resolved. The CGSB will be re-balloting the draft of this standard when it is ready.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 19710200

STATUS : Ongoing

CHARACTERISTICS OF EFFECTIVE WATERPROOF SEALERS FOR MASONRY

The objective of this project is to study the vapour permeability characteristics of effective sealers applied to masonry walls. The issue being explored is not one of stopping water absorption/penetration into the masonry, since most sealer products are effective in this role. Rather, the project attempts to assess the extent to which sealers permit drying of the masonry once the masonry is wetted. In addition, the project will explore the risk posed to sealed masonry to freeze-thaw damage if the sealers entrap moisture within the masonry units. CMHC, in partnership with Masonry Canada, is providing funds to the University of Waterloo to undertake this preliminary study. This phase of the project will investigate the performance of 5 sealer types on individual masonry units and small masonry panels. The testing of the vapour permeability of the masonry test panels is still ongoing. The project is expected to be completed by spring 2008.

CMHC Project Officer : *Silvio Plescia* — ***CIDN*** : 25610200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CHARACTERIZATION OF THREE TYPES OF CLAY TO FACILITATE THE DEVELOPMENT OF CLAY-BASED ENVIRONMENTALLY FRIENDLY PRODUCTS

Clay based plaster is rare, misunderstood and poorly documented. This product has real potential, however, for sustainable development in the housing sector. This External Research Program project is a study of three types of clay in order to establish the scientific bases of knowledge on the manufacture of raw clay materials. Such plaster is usually composed, in descending order, of the following materials: sand, clay, vegetable fibre and hydrated lime putty.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 28920207
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

COMPRESSED EARTHBLOCK (CEB) - STRAWBALE HYBRID BUILDING SYSTEM

This project will investigate the performance of straw bale insulation in combination with compressed earth blocks, as a hybrid building system. The researcher will be monitoring energy use as well as some of the performance characteristics of the earth blocks. The project has been initiated but construction has not yet started.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 36260216
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

DEVELOPMENT OF HIGH PERFORMANCE STUCCO FOR DURABLE HOUSING CONSTRUCTION: A PILOT STUDY

This research project, a collaboration between NRC-IRC and CMHC, was conducted in an effort to improve the moisture performance characteristics of stucco cladding by modifying existing stucco design mixes and testing new materials. The experimental work was carried out in two phases. Phase I established the basic moisture-transport properties, water-vapour permeabilities and water-absorption coefficients of four stucco materials currently used in Canada. In phase II, researchers tested four trial high-performance stucco materials having lower water-absorption coefficients but higher water-vapour permeabilities than the base-case stucco materials tested in Phase I.

Authors: P. Mukhopadhyaya; M.K. Kumaran; J. Lackey; N. Normandin. CMHC Project Officer: Silvio Plescia. Ottawa: National Research Council of Canada, Institute for Research in Construction, 2006. 24 pages. (Report no. B-1154.1.)

Note: No. 07-104 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65421)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and CMHC web site (Highlight) Institute for Research in Construction and http://irc.nrc-cnrc.gc.ca/pubs/fulltext/b-1154.1/ (report)

EFFECTS OF MESH AND BALE ORIENTATION ON THE STRENGTH OF STRAW BALE WALLS

This External Research Program project is investigating different variables in straw bale construction to observe their effects on the strength of the wall assembly. Factors including bale orientation, the use of a mesh over the bale, and plaster type will be examined. Several walls have been built and tested so far with more to be built and tested this summer. A final report is not due until 2008.

CMHC Project Officer *: Don Fugler*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : 34380206

STATUS : Ongoing

GYPSUM WALLBOARD CORE STRUCTURE AND EFFECTS ON END USE PERFORMANCE

Gypsum wallboards are used as an interior finishing surface in many Canadian houses. The core structure of gypsum wallboard contributes to the board's end use, fire resistant properties and fastening strength. Commercial boards have core structures which may differ greatly. This research study, funded under CMHC's External Research Program and undertaken by Innogyps Inc., will attempt to generate different representative core structures and determine a relationship between structure and these end use performance features. Representative laboratory board samples will be created using different industry available chemical foams in various formulation concentrations; fire resistance (extreme temperature dimensional stability) and fastening strength (nail Pull test) will be measured. This project is expected to be completed by end of December 2007.

CMHC Project Officer *: Silvio Plescia*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : 34380204

STATUS : Ongoing

RELATIONSHIP BETWEEN MOISTURE CONTENT AND MECHANICAL PROPERTIES OF GYPSUM SHEATHING

CMHC sponsored a two-phased research project, the objective of which was to assess the relationship between moisture content (MC) and the mechanical properties of various gypsum-based sheathing products (for example, gypsum panel products intended for use as exterior sheathing on buildings). Specific properties examined included: 1. water absorption; 2. adhesion or delamination of facer material (either glass-fibre mats, treated paper or untreated paper); 3. sheathing's ability to resist fastener pull-through; 4. flexural strength of the sheathing, for seismic considerations and as an index of overall mechanical integrity.

The first phase of the project involved the wetting of the gypsum products to: 1. develop correlations between MC and mechanical properties; and 2. determine maximum acceptable levels for MC of gypsum sheathing as stipulated in the National Building Code for lumber used in construction.

Phase One included also an evaluation of the accuracy of hand-held moisture meters for measuring moisture content of gypsum sheathing and determining the saturation level of moisture content for various types of gypsum sheathing. It contained also a proof-of-concept testing to investigate the performance of gypsum sheathing in situ under controlled environmental conditions.

The objective of Phase Two was to determine whether the mechanical properties of gypsum sheathing could be rehabilitated by drying it out once it had been wetted. Gypsum specimens were wetted to various levels of MC, dried and then tested for flexural strength and resistance to fastener pull-through. Results from the "wetted" samples were then compared to "un-wetted" specimens.

Prepared by Alex McGowan and Martin Gevers, Levelton Consultants Ltd. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2005-2006. (External Research Program) I CD-ROM (1574 KB)

Note: No. 07-100 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65344)

STATUS : Completed CD-ROM and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Moisture_Report_Web.pdf

STRAW BALE CONSTRUCTION IN ATLANTIC CANADA

This report examines the evolution of straw bale construction in Atlantic Canada between the years 1993 and 2006 with the intent of capturing the best straw bale building practices in the region. It is also meant to serve as a general resource for people interested in building with bales, and to strengthen the network of people involved in natural building systems across Canada.

Interviews with thirty-four straw bale owners from Nova Scotia, New Brunswick and Prince Edward Island explore the design and performance of their buildings. They also highlight the decision making processes, particularly those tied to site challenges, that led to their respective designs. Complementing the report is a large format map and a database of the profiled projects, as well as a video documentary of the first Straw Bale Builders Gathering in the region.

While only 34 buildings are documented in this report, more than fifty have been identified in the region (pop. 1,832,000) at the time of writing. As many as ten more will be added to the list in 2007 which underscores the significant concentration of bale building activity in the area, especially in relation to Canada wide statistics i.e. Ontario (population 12,500,000) has approximately 150 bale buildings at this time.

Throughout the report owners comment on remediation strategies, unusual features, and tips they would like to share with other builders. The systems described are typical to those constructed across Canada in recent years, with trends towards non-load bearing walls, less pinning and wiring, and a shift towards more earth and lime plasters and/or rain screens. There are a few examples of bales being used for floor or roof insulation. The majority of buildings in the report average 1,500 - 2,000 sq. ft. (139-185 sq. meters) in size.

Accurate observations on energy consumption were difficult to establish as the majority of the buildings use wood either as a primary or secondary heat source.

Information was gathered on the notorious gang of three: fire, rodents, and rot. None appeared problematic as long as precautions were taken to minimize fire risk, rule out access for critters, and build in excellent detailing to avoid moisture problems. There are a number of examples where all of the above precautions were not applied, and remediation strategies were employed to address problems that arose. Indicative of the resilience of straw bale building, these strategies have been remarkably successful.

Prepared by Kim Thompson, Straw Bale Projects, Ship Harbour, Nova Scotia. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2007. ca 62 pages + CD-ROM + DVD (2249 KB)

Note: No. 07-122 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65828)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Straw%20Bale%20Final%20Report(w)_july06.pdf

TEMPERATURE AND MOISTURE CONDITION OF WOOD STRUCTURAL MEMBERS EMBEDDED IN INTERIOR INSULATED SOLID MASONRY WALLS, MONITORING OF THE GROSH BUILDING, STRATFORD, ONTARIO

Two projects were launched to monitor the temperature and moisture content of wood structural members (joists) embedded in interior insulated solid masonry walls. Houses with solid masonry walls in Kincardine, Ontario, and Wolsely, Saskatchewan that were retrofitted with interior insulation were fitted with the necessary instrumentation to monitor the moisture and temperature regimes in wood joists embedded in the masonry walls. Based on the limited monitoring conducted in the two houses, the long-term durability of the wooden members does not appear to be adversely affected by the installation of the interior insulation systems. However, there was one exception. In the Kincardine House, joist ends embedded in the stone foundation wall experienced ever increasing moisture content after the installation of the interior insulation (spray applied poly urethane foam). It was suspected that moisture wicking up the foundation wall became trapped and this raised the moisture content of the monitored wood joist end. When the insulation was removed from around the joist, the joist began to dry. This finding supports the general observation that interior insulation retrofits of solid masonry structures should only be considered if moisture issues are first addressed. The reports for the projects will be made available by December of 2007.

CMHC Project Officer *: Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 24290200
STATUS : Ongoing

UPDATING CMHC'S "BUILDING MATERIALS FOR THE ENVIRONMENTALLY HYPERSENSITIVE"

This project will revise and upgrade CMHC's publication "Building Materials for the Environmentally Hypersensitive". The revision will add new information about products listed in the book together with new products that were not commonly used for residential construction in 1993 when the book was first published. Products that are no longer manufactured will be deleted. Results from emissions testing of materials, when available, will be added. The document will be reviewed and updated in 2007 and will be published in 2008.

CMHC Project Officer *: Virginia R Salares*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 36360200
STATUS : Ongoing
NEW

CONCRETE

STRUCTURAL CONCRETE ASSESSMENT, REPAIR, AND MONITORING TECHNOLOGIES IN CANADA

In March 1997, Canada Mortgage and Housing held a consultative meeting with key individuals in the concrete assessment and repair industry to explore the need to continue to research the repair of structural concrete in multi-unit residential housing in Canada. It was generally agreed at the meeting that there is no consistent approach to assessment and repair, but that a consistent protocol for assessment and repair would be desirable.

While there are guides available to the concrete assessment and repair industry, it is generally recognized that each structural concrete evaluation and repair is unique. Guides include those published by the American Concrete Institute (ACI) in the ACI Manual of Concrete Practice, a five volume set as well as a two-volume set of documents specific to concrete repair. In addition, the Canadian Standards Association (CSA) has published CSA Standard S448.1, "Repair of Reinforced Concrete in Buildings". Moreover, there are numerous refereed technical papers published in Canada and internationally describing techniques, technologies, materials, and methods applicable to concrete assessment and repair. Yet in the face of the plethora of information remains the dilemma of applying the most appropriate repair to the particular structural concrete repair problem.

Ideally, a decision tree would be developed that allowed the assessing consultant to select through an iterative symptom and consequence path, the most appropriate repair. This does not exist in wide circulation. As a first step to that goal, the participants at the March 1997 meeting determined it necessary to establish the current state of the art for concrete assessment and repair. Thus, Canada Mortgage and Housing Corporation initiated this study.

The objective of this study was to report on the most common assessment, repair, and monitoring practices employed by consultants in Canada. This study incorporates the results of a survey of ten consultants across Canada that specialize in concrete assessment and repair.

Prepared by Gerald R. Genge Building Consultants Inc. Principal investigator: Gerald R. Genge. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2005. 1 CD-ROM

STATUS : New Completed CD-ROM

AVAILABILITY : Canadian Housing Information Centre

See also: DETAILS FOR SUSTAINABILITY IN PRECAST CONCRETE, p. 30

CONSUMER INFORMATION

CREATION OF CONTENT FOR "ABOUT YOUR APARTMENT" FACT SHEETS

This project builds on the success of CMHC's About Your House series by providing consumer level information for the residents of multi-unit residential buildings. Key topics ranging from resolving indoor air quality, water penetration, occupant comfort, saving energy and water, through to security and safety are being covered. Much of the material is being developed from existing CMHC research and publications. The information will be organized into fact sheets that consumers and property owner-managers can use to solve problems in their buildings. The first 10 publications will be completed by March 2008.

CMHC Project Officer *: Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 31660200

STATUS : Ongoing

BEST PRACTICE GUIDE - WINDOWS

In partnership with Natural Resources Canada and the Homeowner Protection Office, CMHC developed this comprehensive and practical technical advisory document for architects, engineers, builders, renovators, window manufacturers, window installers and others involved in the design, specification, construction, installation and interfacing of windows within the exterior wall assembly in both low-rise and high-rise residential construction. This document provides guidance in selecting the appropriate window performance criteria for the intended application and provides installation details to ensure the performance criteria is achieved through the effective continuity of thermal, air, vapour and moisture barriers at the interface between the window units and the wall assembly. The project has been completed and the document is being translated and formatted for publication. The Best Practice Guide will be available by spring of 2008.

CMHC Project Officer *: Silvio Plescia* — ***CIDN*** : 30870200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATING THE EFFECTIVENESS OF WALL-WINDOW INTERFACE DETAILS TO MANAGE RAINWATER

Based on the need for effective window-wall interface details to manage water intrusion, CMHC is developing a Best Practices Guide for Window Installation that will be applicable to both low-rise wood frame construction and high-rise buildings. To support the development of the Guide, and the needs of the fenestration, wall cladding and flashing industry, CMHC in partnership with the National Research Council (NRC), formed a consortium of interested North American organizations to evaluate specific window-wall interface details to determine how effective the details are in managing rainwater. CMHC and NRC funded the first year of this multi-year study. The Phase 1 testing program, highlighting wall-window interface details of interest to CMHC, was completed in fall of 2006; the final Phase 1 report is expected by December of 2007. The Phase 2 testing program, funded by industry partners, was completed in the winter of 2007. The final Phase 2 report is expected to be completed by spring 2008. Phase 3 of this study, funded by Public Works Government Services Canada, will commence in the fall of 2007 with expected completion by summer 2008.

CMHC Project Officer *: Silvio Plescia* — ***CIDN*** : 27080200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

THERMAL PERFORMANCE OF WINDOW ASSEMBLIES

CMHC in collaboration with the National Research Council, together with industry participation, is undertaking a study to investigate the thermal performance of window installations. Current and best practice window installations will be tested and evaluated for typical wood-frame residential building construction; consideration will be given to investigating different window frame materials and profiles, a variety of interior-exterior temperature conditions, the position of the window within the rough opening and the contribution of insulation between the window and the rough opening to overall thermal performance of the installed assembly. The test data will then be used to validate computer models. Parametric analysis will be undertaken to examine the performance of the window-wall interfaces for different climates across Canada. The project is expected to commence by December 2007. Project completion is expected by the summer of 2009.

CMHC Project Officer *: Silvio Plescia* — ***CIDN*** : 33180200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

AIR LEAKAGE CONTROL DEMONSTRATION PROJECT IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will assess the individual and collective impact of air sealing measures on building envelope air leakage characteristics, building energy consumption, indoor air quality and occupant comfort in multi-unit residential buildings. Air sealing products and measures will be documented for common air leakage points. The predictive capabilities of existing air leakage models will be assessed by comparing their estimates of annual energy savings with that actually achieved in practice. Currently one air leakage control project is underway. Two other projects have since been discontinued at the request of the property management due to other repair/maintenance and capital replacement priorities. The remaining project is in Saskatoon, Saskatchewan and the air leakage control work has been completed. The assessment of the costs is underway and the impact of the air leakage control measures on energy consumption will be estimated based on energy metering over the next year. This project will be completed by March 2008.

CMHC Project Officer *: Duncan Hill*	***CIDN*** : 30410200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

The potential for energy and greenhouse gas emission reductions in multi-unit residential buildings due to the implementation of energy efficiency measures is being assessed using the building files of the CMHC HiSTAR database. Two projects are currently underway to assess the extent to which multi-unit residential buildings must be retrofitted in order to meet 10%, 20% and 40% reductions in energy use. The studies are limited to the HiSTAR database due to the lack of available information on the total number of multi-unit residential buildings in Canada. In a related, interdepartmental project, an energy and green house gas emission simulator (BESET) has been developed by Natural Resources Canada to analyze the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions can be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The two CMHC reports that are studying the retrofit potential of multi-unit residential buildings have been completed and are under review. The reports will be available by March 2008.

CMHC Project Officer *: Duncan Hill*	***CIDN*** : 22490200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

APPROACHING NET ZERO ENERGY IN EXISTING HOUSING

This research project will explore the technical feasibility of reducing the energy consumption of existing houses to net zero on an annual basis. The project will characterize the energy consumption patterns in existing housing and compile energy efficiency and energy generation measures. Through this work, the potential for energy reduction, energy storage and renewable energy generation will be assessed. The project will also consider the trade-offs in comfort, cost, and convenience necessary to attain very low energy consumption in existing housing. This is conceptual research as the possibility of creating a net-zero-energy house from an existing dwelling is expected to be extremely challenging. This project should be completed by January 2008.

CMHC Project Officer *: Don Fugler*	***CIDN*** : 36920200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

ASSESSMENT OF REFLECTIVE INTERIOR SHADES AT THE CANADIAN CENTRE FOR HOUSING TECHNOLOGY

Past shading experiments at the Canadian Centre for Housing Technology twin-house research facility revealed that opaque exterior shades provide an effective means of reducing air conditioner cooling loads. However, similar trials of interior Venetian blinds provided evidence of only a slight daily savings (<1 per cent) in cooling energy consumption on the clearest days. Unfortunately, exterior shading is not always an option due to location: the exterior of fixed windows on the upper stories of apartment buildings or homes is not easily accessed by residents for temporary shading during summer months. Cost can also be a limiting factor—it is difficult to justify the expense of an elaborate exterior shading system when the cooling season is so short in many parts of Canada. For these reasons, Canada Mortgage and Housing Corporation is interested in finding a simple and inexpensive means of reducing the cooling loads from the interior of the home.

The purpose of this project was to evaluate the potential of a reflective interior shading device to reduce cooling loads, while carefully observing the shade's effect on window temperatures. It was hoped that this device would offer significant savings in cooling consumption, producing energy savings for consumers, and helping to reduce the peak cooling season demands on utilities.

Prepared by M.M. Manning, M.C. Swinton; K. Ruest. CMHC Project Officer: Ken Ruest. Ottawa: Canadian Centre for Housing Technology; Canada Mortgage and Housing Corporation, 2007. 46 pages (1653 KB)

Note: No. 07-102 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65295).

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Reflective_WEB.pdf

CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, conducted a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The project identified what data is available on energy and water end uses, research projects, data, monitoring protocols and published information relating to energy and water load profiles of housing. The study concluded that consistent, accurate and detailed load profiling data is not available for all end-uses in dwellings, particularly multi-unit residential buildings. CMHC and NRCan plan to develop a load monitoring protocol that will be used to gather data in both single family and multi-unit residential buildings in a consistent and systematic manner. Upon completion of the protocol, load monitoring projects will be conducted in dwellings across Canada. The results of the load profiling literature search will be made available in a CMHC research highlight by March 2008.

CMHC Project Officer *: Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 22010200

STATUS : Ongoing

CMHC ENERGY EFFICIENCY CASE STUDIES MOLE HILL COMMUNITY GROUND SOURCE HEAT PUMP CONVERSION PROJECT

A project has been initiated to document, as an energy efficiency case study, the conversion of the dwellings of the Mole Hill Community to ground source heat pump systems. The project will describe the situation that led to the decision for the conversion, the design, installation and commissioning, and the post installation performance of the systems. The annual energy use of the project, after the conversion and any resultant cost savings will also be identified. The project will be completed by the fall of 2007.

CMHC Project Officer* :** *Duncan Hill* — ***CIDN : 18990200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DESIGN SURVEY OF LOW ENVIRONMENTAL IMPACT HOUSING

This research project will provide a documentation of the best existing examples of low environmental impact housing forms (including net zero energy) to date in Canada and internationally in similar climates. The goal is to eventually establish criteria and specifications for zero environmental impact housing in Canada, develop best practice models towards achieving this goal, and ultimately demonstrate these "deep green" housing models for Canadian climatic regions. Case studies of this series will be published on the CMHC web site.

CMHC Project Officer* :** *Duncan Hill* — ***CIDN : 25400200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF A CONTRACTOR'S AIR LEAKAGE CONTROL MANUAL AND SEMINAR SERIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in consultation with members of the air barrier-air leakage control industry, will develop an air leakage control manual for multi-unit residential buildings. The manual will provide contractors with information on how and where air leakage occurs in these buildings and techniques that can be used to seal them. The goal of the project is to provide the training material necessary to support the development of an air leakage control industry that will be available to meet the needs of the multi-unit residential building sector and to promote air leakage control as a cost effective way to reduce energy consumption in buildings while addressing other issues such as building envelope durability and occupant comfort. The content for the manual was completed in July 2005. The Guide has been sent for final review by leading industry stakeholders and publication is expected by March 2008.

CMHC Project Officer* :** *Duncan Hill* — ***CIDN : 32080200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF AN ENERGY MANAGEMENT PILOT PROGRAM FOR SOCIAL HOUSING IN ONTARIO

CMHC is participating in the development of an Energy Management Program and pilot project for social housing. CMHC will be working with the Social Housing Services Corporation of Ontario to develop an Energy Management Program that will provide local social housing providers with the tools needed to evaluate and implement energy and water efficiency measures in their buildings. CMHC support will be used to develop or adopt tools for the Energy Management Program including utility tracking and on-line energy/water audit facilities, standard energy audits, and communication documents for property owners, managers and residents. CMHC will also participate in the evaluation of energy and water efficiency projects in 20 buildings selected to participate in a pilot project to evaluate the costs and benefits of the Energy Management Program. CMHC support will be useful to establish the Program in Ontario and will also provide other provinces with useful information on the development of central energy programs for their social housing stock as well. The project report will be available in 2007.

CMHC Project Officer *: Duncan Hill* ***CIDN*** : 29820200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DOCUMENTATION OF AN ENERGY MANAGEMENT PLAN FOR SOCIAL HOUSING

CMHC is preparing a report to describe an Energy Management Plan developed for Social Housing Providers. The report will document the organizational structure, processes, tools, documents, financing strategies, reporting, and quality assurance of the program. The final report will be delivered to all provincial and territorial housing agencies so that they may become informed of the Ontario program and to provide them with the opportunity to engage the plan, or any of its individual components, within their own jurisdictions.

CMHC Project Officer *: Duncan Hill* ***CIDN*** : 36070200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFECT OF SUNLIGHT CONTROL IN APARTMENT BUILDINGS

This External Research Program project will evaluate the impact of various sunlight control strategies on comfort conditions and energy use in multi-unit residential buildings. Sunlight control is important to prevent overheating which can lead to higher air conditioning costs and occupant comfort problems. Sunlight control is also required to allow for full use of solar gains to offset space heating and lighting loads. The control strategies will be assessed using computer models that can predict indoor conditions and energy loading with different architectural features such as awnings, sun shelves, lintel arrangements and other shading strategies. The final report will generate design guidelines for the control and optimization of sunlight for multi-unit residential buildings.

CMHC Project Officer *: Duncan Hill* ***CIDN*** : 28920204
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENERGY EFFICIENCY AND RETROFIT IMPLICATIONS OF BUILDING RECOMISSIONING SURVEY

CMHC, in cooperation with Natural Resources Canada, conducted a literature survey of the availability of recommissioning guidelines and other "tune-up" procedures for multi-unit residential buildings. The survey found that there was no single source of published information for enhancing the performance of multi-unit residential buildings via low and no-cost measures. Information was found to be available for individual measures to improve space heating, domestic hot water, lighting and appliances, building envelope and ventilation systems. Given the absence of recommissioning, or tune-up, guidelines for multi-unit residential buildings but the availability of information for discrete building systems from a wide variety of sources, the project concluded that CMHC should initiate a subsequent project to compile the measures into a single Tune-Up Guide for Multi-Unit Residential buildings. The project is complete. A Research Highlight detailing the findings of the literature search will be published in 2007.

***CMHC Project Officer** : Duncan Hill*	***CIDN*** : 23590200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in both new and existing multi-unit residential buildings to be used as case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC has developed. The case studies completed include: 1. Conservation Co-op, Ottawa; 2. Energy Efficiency Retrofit of the Broadview Apartment Building, Toronto; 3. Almon Street CBIP Building; and 4. Apartment Building Retrofit, Bay Street, Toronto. Ongoing projects include: 1. Performance of an Apartment Building equipped with a Water Loop Heat Pump System; 2. Grandin Green CBIP Building; and 3. Energy and Thermal Performance of an ICF Apartment Building. The case studies will be published as a part of the CMHC Better Building Series starting July 2005 and will be issued periodically as they are completed.

***CMHC Project Officer** : Duncan Hill*	***CIDN*** : 18990200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is on the web	

MONITORING OF THE ACTIVE SOLAR SPACE AND WATER HEATING SYSTEM AND INDOOR AIR QUALITY AT THE FACTOR 9 HOME

This project will support a multi-stakeholder initiative to design, build, monitor, and showcase a Factor 9 detached house in Regina, SK in 2005. The Factor 9 house will use 90% less energy and 50% less water than current Regina housing; and address other environmental issues such as: landscaping, indoor air quality, construction waste management, and durable building materials. This project will provide the monitoring component and will commence upon occupancy, after the 30 day show home period following the completion of construction. An automated datalogging system will be used to take continuous readings of natural gas, electricity, and water consumption rates, as well as appliance consumption rates, indoor temperatures and indoor air quality parameters. The project will demonstrate that significant water and energy efficiencies can be met in housing using existing technologies without added costs. The project will lead to an increased consumer awareness and market penetration of efficient housing in Canada.

***CMHC Project Officer** : Anand Mishra*	***CIDN*** : 35480200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

REGULATORY AND ORGANIZATIONAL REQUIREMENTS FOR PRIVATE DISTRICT ENERGY SYSTEMS

A research project is underway to assess the regulatory and organizational requirements of non-public utilities that provide service to multi-unit residential buildings. The project will identify issues regarding utility ownership and operation that must be addressed, governing regulations, and potential ownership-client arrangements. The project will provide guidance to private firms, housing providers, developers and condominium corporations that may be considering the generation of heat and power for sale to individual apartments or entire buildings within a community. This project is a part of a larger program of work being conducted in cooperation with Natural Resources Canada to assess the opportunities for ground source heat pumps in district energy systems. Ownership and regulatory issues represent a challenge to those other than established public utilities who would like to provide energy services, from ground sources, renewables as well as conventional technologies, to individual or clusters of multi-unit residential buildings. The project will be completed by December 2007.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 32960200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

STRATEGIES FOR ALTERNATIVE ENERGY USE AND REDISTRIBUTION AT THE BUILDING ENVELOPE

As part of a three year Panel on Energy Research and Development (PERD) initiative, integrated consultant teams explored the potential strategies to reduce, generate or recover and redistribute energy at the building envelope of multi-unit residential buildings for Prairie, Vancouver, Toronto and Halifax locations. The teams include expertise in building management, and development, as well as architectural, engineering and energy simulation. Each team developed recommendations for the strategies most feasible in their study areas. In Montreal a charrette led by NRCan explored sustainable strategies for a mixed-use project which includes retrofit and new commercial and residential development. The findings of the Prairie team have been used to develop strategies for a housing development in Regina. A commentary of the strategies, representing analysis of building envelope-related energy strategies for Halifax, Toronto, Calgary, and Vancouver has been written and is available.

CMHC Project Officer : *Sandra Marshall* — ***CIDN*** : 08400306
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Research highlight is not yet available

SUPPORT FOR IEA ANNEX 39: HIGH PERFORMANCE THERMAL INSULATION SYSTEMS

The International Energy Agency (IEA) has launched an R&D program to research high performance thermal insulation systems for buildings. The project will focus on vacuum insulation panels that can achieve, in theory, an insulating value of R75 per inch. Vacuum panels represent an order of magnitude improvement over conventional insulating materials, thus the energy saving potential for both new and existing buildings is enormous. Plans are being developed to organize and run a demonstration project using vacuum panels in order to assess their application and performance in buildings. CMHC will be supporting Canada's contribution to the IEA project, led by NRC's Institute for Research in Construction, and will be able to disseminate the results to the housing industry. Canada has also been asked to participate in the development of an international standard for vacuum insulating panels as a part of the IEA effort. The project is currently underway and will be completed by March 2008.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 30450200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF COMPRESSED AIR FOAM SPRINKLERS

Automatic fire sprinklers that use large quantities of water to suppress fires are often unsuitable in remote and northern communities, when the water supply is scarce. The project will modify existing compressed air foam (CAF) sprinkler technology developed by NRC for institutional and commercial use, for single- and multi-family housing. Under the direction of Dr. Andrew Kim at NRC, the project will demonstrate compressed air/foam sprinklers which require a fraction of the amount of water used by conventional sprinklers, in a residential application suitable for use in northern and remote communities. A prototype will be tested in a controlled fire in a vacant house. The project should be complete by the spring of 2008.

CMHC Project Officer *: Barry Craig* **CIDN** : 24680201
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FIRE PREVENTION MANUAL AND VIDEO: A HOUSING MANAGER'S GUIDE

The objectives of this research are to identify the types of fire-related problems encountered in Aboriginal communities and their impacts on housing, to determine and document possible solutions to alleviate the problems and impacts, and to produce a user-friendly, plain language manual that will assist housing managers and a film on fire prevention and safety targeted to community members.

CMHC Project Officer *: Ian Melzer* **CIDN** : 31830200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SPECIAL INTEREST GROUP ON FIRE PERFORMANCE OF HOUSES

In recent years, Canadian fire death statistics have followed a downward trend. As technological advances introduce new construction practices, building designs and materials into new house construction, the fire protection community needs evidence that safety isn't compromised. The Canadian Commission on Building and Fire Codes (CCBFC) and the Canadian Commission on Construction Materials Evaluation (CCCME) have requested information regarding the potential impact of such changes on the fire safety of low-rise housing. In response, NRC's Institute for Research in Construction (IRC), in partnership with CMHC, government, industry, and codes and standards agencies, has begun a project to research fires in single-family dwellings and the factors affecting fire safety. The primary objective of this research is to determine the impact of innovative residential construction products and systems on fire safety. The project should be complete in 2007 and a final report available in 2008.

CMHC Project Officer *: Barry Craig* **CIDN** : 33100200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

TESTING FIRE AND SMOKE MOVEMENT IN ACCESSORY APARTMENTS

The study will test the movement of fire and smoke in a single family residence containing an accessory apartment. A test protocol will be designed to measure the ability to control smoke and fire by use of fire separations, closures (including doors), ventilation systems, plumbing and firestops. The study will also measure the time for smoke detectors to respond to a fire situation, for environments to become untenable and for occupants to safely evacuate. Results of this research will: 1. determine the significance of the fire performance of conventional fire separations in Canadian houses to the safety of occupants in houses containing an accessory apartment; 2. measure the fire performance of traditional house construction, as a benchmark for evaluating the fire performance of innovative construction products and systems; and 3. measure the products of combustion produced by a standard fire in various locations in a simulated building containing an accessory apartment as a benchmark for evaluating evacuation times. This research will be useful to authorities to produce legislation for safer housing, and in establishing performance criteria for accessory apartments. Occupants will be safer and better-informed of the dangers of household fires. The draft research report should be complete in late 2007 and the final report in 2008.

CMHC Project Officer : *Barry Craig* **CIDN** : 35690200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ***NEW***

GREEN ROOFS

GREEN ROOFS: A RESOURCE MANUAL FOR MUNICIPAL POLICY MAKERS

Green roofs are vegetated roof covers which can improve stormwater management, increase green space in dense urban areas and help reduce a building's contribution to the heat island effect. This Manual is an overview of international and Canadian green roof policies and programs. It features 12 jurisdictions that demonstrate leadership in green roof policy development, and shows how other Canadian and U.S. cities are developing supportive policies. By reviewing the reasons municipalities throughout the world have set green roof policies and programs, policy makers can better determine which policies suit their needs.

Authors: Gail Lawlor, Beth Anne Currie, Hitesh Doshi, Ireen Weiditz. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2006. 146 pages

Nota: Aussi disponible en français sous le titre : Toits verts : Manuel de ressources destiné aux décideurs municipaux

Order number 65255

Note: No. 06-113 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order no. 64934)

STATUS : Completed CD-ROM and Research Highlight

AVAILABILITY : CMHC Information Products

GREEN ROOFS

PROGRAMME DE VÉGÉTALISATION DE BÂTIMENT : RAPPORT FINAL

This report is published in two volumes: the final report and a book of appendices to the final report. The report also includes a CD containing the digitized version of the final report and the book of appendices.

The Vivre en ville group is the author of this report, and this group was supported by different financial partners, including CMHC, the City of Québec and the Green Municipal Fund of the Federation of Canadian Municipalities.

The final report examines building greening techniques, including green roofs and walls, as well as green cornices. The report discusses the advantages of greening a building, for example, improving the energy efficiency of the building, reducing runoff water, improving urban air quality, reducing city or air traffic noise and providing additional surfaces.

The authors experimented with new greening technologies using the two buildings of the Centre de la culture et de l'environnement Frédéric Back in the city of Québec. The report presents temperature data and analyzes the energy savings and the reduction in greenhouse gases associated with the greening techniques.

The report establishes a list of indicators, a detailed list of the project costs and a breakdown of the financial contributions. The details of the activities performed are also explained, such as the roofing work, the plumbing work, the planting of the vegetation and the installation of the green cornices and green walls.

Prepared by Vivre en ville, Regroupement québécois pour le développement urbain rural et villageois viable. Québec : Vivre en ville, February 2006. 2 volumes.

Note: No. 07-112 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65302).

STATUS : Completed Report and Research Highlight

AVAILABILITY : On a loan basis only from the Canadian Housing Information Centre

HEATING AND VENTILATION

ASSESSMENT OF NATURAL VENTILATION FOR CANADIAN RESIDENTIAL BUILDINGS

There are generally two types of ventilation in houses: natural infiltration (and exfiltration) produced by stack and wind pressures, and mechanical ventilation by exhaust or intake fans operating across the house envelope. Natural infiltration is variable. This research project used historical data collected in Ottawa by NRC to roughly establish those periods of low natural ventilation - when stack and wind pressures are so low that sufficient natural ventilation does not occur. NRC used modelling and weather data to extend the analysis to other locations in Canada. Tighter houses without window openings in summer were habitually under ventilated The project results help to establish when and where mechanical systems should be operating to supplement natural infiltration.

Prepared by J.T. Reardon, Institute for Research in Construction, National Research Council Canada. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2007. 107 p. (2946 KB)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_Assessment_Natural(w).pdf

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project was to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute for Research in Construction, monitored indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance was also assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, are used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings. A report and research highlight documenting the results of the project will be available by March 2008.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 19340200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING

Two-pipe water loop heat pump systems represent an innovative approach to heating and cooling multi-unit residential buildings. The system consists of a central water distribution system that distributes moderately warm water to each apartment in the winter and cool water in the summer. An in-suite heat pump fan coil unit is then used to heat or cool the apartment depending on the season using the central water loop as a heat source or a heat dump. In theory, the system will allow for simultaneous heating and cooling of different areas of the building by redistributing heat to where it is needed. This ability is thought to offer significant energy savings but the extent to which this may be the case has not been evaluated. CMHC is undertaking a project to characterize the performance of a water loop heat pump system in a multi-unit residential building in Ottawa so that the potential for energy savings can be assessed. The project will evaluate energy consumption, and operational and maintenance issues over a one-year period. The project will be completed in March 2007.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 18990200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ENQUÊTE DE TERRAIN SUR LA PERFORMANCE DES FILTRES ÉLECTRONIQUES RÉSIDENTIELS

The principal objective of the project was to determine the means by which occupants of a house could easily verify the correct functioning of their electronic filter (e.g., fouling of a white surface), or to make recommendations for the number of times per year that the collecting plates and ionizing wires of an electronic filter should be cleaned. A second objective was to investigate whether heart rate variability, an indicator of cardio respiratory health in a non-resting subject, could be used to establish a link between occupant health and effective domestic air filtration.

Prepared by TN conseil, Conseillers en technologie de l'environnement inc. Principal researcher: Pierre Hosatte. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2007. 39 pages (3518 KB)

Note: No. 07-117 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65684)

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/Enqueteterrain.pdf

EXPLORING VENTILATION SYSTEMS FOR MURBS IN MARITIME CLIMATES

CMHC, in cooperation with the Homeowner's Protection Office of British Columbia, will conduct a research project to study two key ventilation issues affecting multi-unit residential buildings in the moderate coastal regions of Canada. Specifically, the project will evaluate the extent to which moisture laden outdoor air can be used to control indoor moisture loads without mechanical air conditioning or dehumidification. The project will also assess the ability of simple semi passive ventilation systems to exchange, condition, distribute and circulate air within individual apartments. Semi-passive ventilation systems offer many advantages to conventional MURB ventilation but the extent to which they can meet ventilation needs under varying indoor outdoor conditions and occupant lifestyles must be explored. The projects will be undertaken concurrently and will be used to produce guidelines for ventilation systems in multi-unit residential buildings in mild coastal climates. The projects will be completed by March 2008.

CMHC Project Officer : *Duncan Hill* | ***CIDN*** : 33170200

Division : Policy and Research Division | ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

TESTING THE PERFORMANCE OF VALVED SOFFIT VENTS IN DEPRESSURIZING ROOF SPACES DURING WINDSTORMS

High winds can damage attic spaces in two ways: by inducing rain or snow into the space or by lifting off the roof framing and sheathing. This research investigated whether a proprietary soffit opening, which closes under high wind loads, will result in reduced attic pressures. The device was field tested for several months in a test house located in a windy area, but the results were not conclusive due to poor wind and instrumentation flaws. Subsequent work by the inventor was more conclusive and is documented in CMHC Technical Research Highlight no. 07-111.

Note: No. 07-111 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65417)

CMHC Project Officer : *Don Fugler* | ***CIDN*** : 34310200

Division : Policy and Research Division | ***STATUS*** : Ongoing

AVAILABILITY : Research highlight is available

TUNE-UP GUIDE FOR MULTI-UNIT RESIDENTIAL BUILDINGS

A guide has been developed that compiles existing information on how on-site staff and contractors can improve, or fine tune, the performance of multi-unit residential buildings. Similar guidelines exist for commercial buildings but are referred to as re-commissioning guidelines. The guide will provide low cost and no cost methods to improve the performance of building envelope, space and domestic hot water heating, ventilation, health and safety, and electrical systems and appliances in multi-unit residential buildings. While the energy savings accrued are expected to be modest, use of the guide will ensure that buildings operate efficiently and performance problems are resolved before they become larger concerns. The Tune-Up guidelines will also allow a property owner or manager to establish optimal system conditions so that the impact of repairs, renovations, or energy and water efficiency improvements can be realistically evaluated. The Guide will be available by March 2008. CMHC field testing of the Guidelines in Toronto and Saskatoon began in September 2003 but delays in implementation in both cities lengthened the post implementation periods to March 2006 for Saskatoon and possibly December 2006 for the Toronto projects.

CMHC Project Officer : Duncan Hill | ***CIDN*** : 23590200

Division : Policy and Research Division | ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDES UPDATE

This project will revise, one at a time, the five existing Best Practice Guides, starting with Brick Veneer Steel Stud published in 1996. New research and user feedback from seminars based on the guides and from CMHC's web site indicate that some text and details need updating. Partnerships will be developed with interested parties for input, review and promotion. A national competition will be held to select a consultant for each guide who will be responsible for coordinating and producing the revision work. Each consultant will work with an advisory committee, specific to each guide, who will participate in drafting the new edition. The advisory committee will include practitioners, industry representatives, manufacturers and regulators. The work will include a thorough study of the existing Guide, an analysis of users' feedback, and roundtable critique sessions. Public sessions will be held to discuss the proposed revisions. The consultant will then collect the information, produce the revised manuscript and obtain consensus from the advisory committee. The revised Brick Veneer Steel Stud guide is currently being reviewed by the advisory committee, and should be complete in 2008.

CMHC Project Officer : *Barry Craig*
CIDN : 23780200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

BETTER BUILDINGS - RETROFIT CASE STUDIES

This project documents and illustrates repairs and upgrades to multi-unit residential buildings across Canada. It is estimated that, in this country, $300 M is spent every year in premature building failures. CMHC is collecting and publishing easy to read case studies to present to owners, architects, builders and property managers on what can go wrong and why, how to fix it and how much it will cost. Most cases will focus on the building envelope since the vast majority of documented problems occur there, in addition to examples of energy and acoustical upgrades. This project adds to CMHC's current documentation and publication of case studies on repair and retrofit of multiple-unit residential buildings. Ultimately, a repair guide will be developed based on this work. Case studies from across Canada are obtained from those directly involved in the repairs and involve buildings of all types of construction ranging in height from 3 to 50 storeys. Every year the Corporation publishes 10 Better Buildings Case Studies on CMHC's website.http://cmhc.ca/en/imquaf/himu/bebufa_021.cfm. Since the project began, in 1999, 57 case studies have been published.

CMHC Project Officer : *Duncan Hill*
CIDN : 33960200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is available on the web

BUILDING ENVELOPE TEST HUT FACILITY PHASE 2 FEASIBILITY STUDY

CMHC, in partnership with the Homeowner Protection Office and Forintek Canada Corporation, provided the British Columbia Institute of Technology (BCIT) with a financial contribution to undertake a study to assess and evaluate the feasibility of building, operating and maintaining a Building Envelope Test facility in which the response of wall assemblies to 'real-time' weather load, as experienced in the coastal climate of British Columbia, can be investigated and evaluated. BCIT is in the process of constructing a state-of-the-art research facility on their Burnaby campus: a two-storey test hut with a capacity for insertion of wall panels of varying configuration and rain-deflection details. The second storey will allow for insertion of balconies and floor-wall junctions.

CMHC Project Officer : *Silvio Plescia*
CIDN : 23840200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : There will be no product for this project

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project reviewed Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites based on the number of building permits issued since 1970. Using STATSCAN data, it was concluded that approximately 6,000 condominium buildings exist in Canada. Based on discussions with the Canadian Condominium Institute and other agencies, this estimate likely understates the number of buildings. The review also found that buildings could not be classified by the number of storeys nor number of units using STATSCAN data. Based on the outcome of this project, CMHC initiated another project with the University of Ottawa to review the data available on condominiums within municipal files. The project revealed that the data exists within the local land registry office but was difficult to extract given the state of the individual files. Nevertheless, the University of Ottawa was able to characterize the population of condominiums in the greater Ottawa area in terms of number of buildings, number of units, number of storeys and age. A report and Research Highlight documenting the project findings are available: "Characterizing the Condominium Population of the Greater Ottawa Area, 1969 - 2002". CMHC repeated the project in Halifax, Nova Scotia, to determine whether or not similar opportunities to characterize the stock of condominiums exist elsewhere. This project has been completed and the report will be available late in 2007.

CMHC Project Officer *: Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2277 02 00001-2
STATUS : Ongoing

DETAILS FOR SUSTAINABILITY IN PRECAST CONCRETE

Sustainability has become essential in building design. Architects need an impartial and accurate document to design sustainable cladding using precast elements. In 2001, CMHC published a Best Practice Guide for architectural precast panels. This work will complement the Guide by providing guidance on architectural sustainability solutions for the system. This document, alone and as part of the Best Practice Guides, will illustrate typical junctions with particular attention to air barrier and thermal continuity, water management and avoiding condensation by diffusion. A consultant will develop a sustainability rationale applied to precast buildings. Construction details showing alternative, greener, materials and practices will be drawn to give architects and owners choices and as the basis for informed solutions. Cost will be a component of the selection criteria in order to maintain competition. A steering committee, which includes major industry stakeholders, has been convened to advise and oversee the consultant's work. Before publication, text and details will be shown at industry events and building envelope councils, in order to achieve the greatest exposure and acceptance as well as receive constructive input. It is expected that the manuscript will be completed by May 2007 and the new Guide will be published in January 2008.

CMHC Project Officer *: Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 33120200
STATUS : Ongoing

ENGINEERED BUILDING ENVELOPE SYSTEMS FOR OUTDOOR/INDOOR CLIMATE EXTREMES

CMHC is contributing to a National Research Council project to identify indoor conditions and weather in northern and northern-coastal communities, and select appropriate building envelope assemblies for extreme climates. The project will assess the hygrothermal performance of these assemblies by computational and laboratory testing, measure air leakage by means of blower door tests and produce performance parameters for heating and high humidity climates. The project will also analyze the energy and environmental impact of proposed building envelope assemblies. The research findings will be published in a research report, and presented in seminars throughout Canada and the North. The project began in the winter of 2004 and a final report should be produced by the spring of 2008.

CMHC Project Officer : *Barry Craig* — ***CIDN*** : 29600200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF BUILDING CONDITION ASSESSMENT REPORTS FOR CONDOMINIUMS

This project will review building condition assessment reports of twenty-five high-rise (over eight storeys) residential buildings to illustrate general trends and formats in use. A building condition assessment is a review and comment on the present and anticipated condition and performance of a building's components. Various elements of the property can be included in the review (architectural, mechanical, electrical, civil, elevating devices, building envelopes, underground parking structures, recreational facilities and other specialty construction). Property managers report that the quality of the condition reports varies widely and there is no consensus on methodology for the assessment, cost allowances and sources of information on replacement costs and service life of many building elements. This creates financial problems when major items in a building have to be replaced and insufficient or no allowance was made to cover the expense. A sample of the reports will be analyzed in detail to ascertain the validity of the predictions, cost estimates, errors and omissions. A standard building condition assessment form will be developed and tested. Five firms will conduct a condition assessment on the same building using the proposed new form which will then be reviewed by interested stakeholders. Owners, managers, prospective owners and firms conducting audits will benefit from this analysis.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 32260200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FIELD REVIEW OF INSULATION RETROFITS OF SOLID MASONRY STRUCTURES

This project will investigate the condition of solid masonry wall assemblies that have been retrofitted with interior insulation to reduce energy use and enhance occupant comfort. Site investigations will visually assess the condition of masonry structures and adjacent insulation and framing layers on the exterior and interior of the wall assemblies. This information is required as there is a general perception in the housing industry that the application of interior insulation to solid masonry wall assemblies will cause the walls to deteriorate due to changes in the heat, air and moisture regimes to which the walls are exposed. This work will result in a compilation of case studies of solid masonry insulation retrofit projects and the development of guidelines for assessing and insulating solid masonry buildings. Case studies will be published as Better Building Case Studies and the knowledge gained through the case studies will be documented in a research publication by March 2008.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 30840200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

FIRST UPDATE: BEST PRACTICE GUIDE: BRICK VENEER CONCRETE MASONRY UNIT BACKING

The Best Practice Guide: Brick Veneer Concrete Masonry Unit Backing (BVCMU) will be revised and updated to comply with or exceed requirements in the new 2005 Model National Code and current standards and test criteria that govern masonry construction in Canada. The drawings will be refreshed to enhance their readability and modified where needed to conform to current codes and practices. The work should be complete in 2008.

CMHC Project Officer : *Barry Craig*
CIDN : 33860200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1800's vintage houses and apartment buildings. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings. The case study reports will be available by December 2007.

CMHC Project Officer : *Duncan Hill*
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HIGH PERFORMANCE THERMAL INSULATION SYSTEMS IN BUILDING APPLICATIONS

CMHC will contribute funding to the Institute for Research in Construction (IRC) in support of its efforts to develop a high performance thermal insulation system and its contributions to a related International Energy Agency Annex in High Performance Insulating Systems. IRC will develop new nano-porous materials for use in vacuum insulation panels and the facility required to test and evaluate the insulation system. Based on the development of the material and the testing, IRC will produce a report on the high performance thermal insulation system it develops and the potential applications and guidelines for use. This project will serve as CMHC's contribution to the building of research capacity at the Institute for Research in Construction in the field of high performance thermal insulation systems. Potential applications within building envelope systems will be conceptualized in order to generate awareness of how this futuristic form of insulation may be eventually applied. The project will be completed by March 2008.

CMHC Project Officer : *Duncan Hill*
CIDN : 33630200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES - COQUITLAM, BC

Wood framed buildings in the Vancouver area have experienced excessive moisture damage to the sheathing boards and wood framing over the past decade. This applied research project, funded by Canada Mortgage and Housing Corporation in partnership with Polygon Homes Ltd., involved the development of a building envelope diagnostic tool, specifically, an in-situ monitoring method to diagnose causes of moisture problems in low-rise wood-framed construction. This method is important to residential building owners as it can be used to develop cost effective remedial repair recommendations and to promote better design and construction guidelines for new buildings. This project's objective was to monitor the performance of the exterior wall assemblies of two, 46 unit four-storey buildings in Coquitlam, BC. Monitoring was carried out for one full year, capturing the wall response to the range of climate loading conditions. Exterior walls, including interior living spaces as well as interstitial wall areas, were monitored for temperature, relative humidity, wood moisture content and air pressure differentials. A weather station, mounted on the roof of one building captured the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring of the buildings started in January 2001. Data collection continued until the spring 2002. A report will be available March 2008.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 22540200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC

Wood framed buildings in the lower mainland of British Columbia have experienced excessive moisture damage to both sheathings and framing materials. In recent years, with the adoption of Best Practice principles throughout the construction industry (by builders and developers, design professionals and various construction trades) coupled with regulatory amendments to the City of Vancouver building by-laws, a new generation of exterior wall assemblies incorporating a 'rainscreen' moisture management strategy has been constructed. How effective were these walls at managing the exterior moisture loads? The objective of this applied research project, funded by Canada Mortgage and Housing Corporation, is to monitor, assess and document the performance of a residential low-rise four storey, wood-framed building which incorporates rainscreen design technology, and to analyze data to determine the effectiveness of wood frame rainscreen wall assemblies at managing exterior moisture loads. Monitoring of interior, exterior and interstitial wall areas will include temperature, relative humidity, wood moisture content and air pressure differentials. A weather station mounted on the roof of the building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Field work is complete and a Research Highlight will be published by March 2008.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 22540200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

INNOVATIVE BUILDING CASE STUDIES

Innovative building case studies document new projects of particular interest to architects and other building professionals. They showcase built projects which use new technologies, sustainable features and innovative planning attributes, among other notable features. As they are completed the studies are showcased on the CMHC website at http://www.cmhc.ca/en/inpr/bude/himu/inbu/index.cfm. New products for 2007 include case studies of construction waste diversion, the Southfield solar house in Ontario, and the Factor 9 house in Saskatchewan.

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 08400306

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

INNOVATIVE BUILDINGS AND CONTINUING EDUCATION ARTICLES FOR ARCHITECTS

CMHC develops and publishes continuing education articles and case studies of innovative buildings for architects. These publications provide technical information on a variety of subjects, especially those related to building envelope issues. The Innovative Building Case studies provide examples of innovative systems or processes, which can help improve industry knowledge. New web-based learning articles requested by the architects' associations and the documentation of additional Innovative Building case studies are ongoing. The latest on-line articles include Design, Selection and Commissioning of Window Installations, Integrated Design Process, and Introduction to Solar Design. An article describing the needs of housing providers will be on-line in the fall of 2007.

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 3366-PLN05

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing. The results of the study will be published as a CMHC Research Highlight by fall 2007.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 22010200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hygIRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hygIRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures. The final project report will be available by December 2007.

CMHC Project Officer : *Duncan Hill*
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

MONITORED PERFORMANCE OF AN INSULATING CONCRETE FORM MULTI-UNIT RESIDENTIAL BUILDING: FINAL REPORT

A research project was undertaken to study the thermal and air leakage performance of an apartment building constructed with an insulated concrete forming system. Temperature sensors were installed in the walls on all elevations and at varying heights of the building during construction so that temperature profiles across the wall sections could be monitored. Additionally, airtightness testing was undertaken to assess the air leakage characteristics of the completed building. A thermographic survey of the ICF wall system was also undertaken to assess the system for thermal bridging. The research project found that while ICF walls offer a relatively well-insulated building envelope system, there was no apparent benefit of the thermal mass of the concrete that could be described in terms of an effective insulating value. However, the ICF wall system produced a remarkably airtight building and was highly effective at isolating exterior conditions from interior conditions.

Prepared by Enermodal Engineering Limited. Prepared for Canada Mortgage and Housing Corporation, Ready Mix Concrete Association of Ontario, Premier Project Consultants and Jamesway Construction Corporation. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2006. 74 pages (7797 KB)

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Monitored_Performance(w)_dec12.pdf

PERFORMANCE AND MAINTENANCE PRIORITIZATION OF BUILDING FAÇADES

Public Works Government Services Canada, National Research Council of Canada and the Canada Mortgage and Housing Corporation are funding this project whose objective is to develop a risk-based framework for the evaluation of façade performance and prioritization of required maintenance for high and medium-rise buildings with consideration of the likely environmental loads. Evaluation of climatic effects in combination with wall response provides a basis for setting maintenance priorities. The process will be used to establish the risks associated with the deterioration amongst the various walls for any given building façade, between the level of risk among different buildings in a given climate or for comparing the relative effects of similar façades located in different climate zones. This project commenced in the spring of 2005 and is expected to be completed by the spring of 2008.

CMHC Project Officer : *Silvio Plescia*
CIDN : 33150200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

PILOT 4-D GRAPHIC TOOL FOR POST-SECONDARY BUILDING DESIGN PROGRAMS

Through this project, an existing high-rise graphic package (as developed for limited use in earlier CMHC Research) will be enhanced to serve as a tool to assist in educating students and practitioners as to the interrelationship of various components (structure, fire suppression systems, cladding, photovoltaics, etc.) on high-rise buildings. The project is intended to determine the market for this type of educational tool within community colleges. To date, the survey tool has been designed and a preliminary list of potential respondents across Canada developed. The project is now expected to be completed by December 2007. This project is undertaken in partnership with Seneca College.

CMHC Project Officer : *Mark Salerno* ***CIDN*** : 32250200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE

The objective of this project is to produce a revised version of CMHC's Brick Veneer Steel Stud Best Practice Guide, published in 1996. New research and user feedback from seminars based on the guide and from CMHC's web site indicate that some details need updating. Partnerships have been developed with interested parties for input, review and promotion. A national competition was held to select the consultant responsible for coordinating and producing the revision work. The consultant, responsible for the revisions, is working with an advisory committee, specific to the BVSS guide, which participates in drafting the new edition. The advisory committee includes practitioners, industry representatives, manufacturers and regulators. The work began with a thorough study of the existing Brick Veneer Steel Stud Guide, including an analysis of users' feedback, followed by roundtable critique sessions. Public sessions were held to discuss the proposed revisions. The consultant then collected the information, produced the revised manuscript and is now in the process of obtaining consensus from the advisory committee. Revisions to the text and details are with the advisory committee for their comments. The revised Brick Veneer Steel Stud Guide should be in print in 2008.

CMHC Project Officer : Barry Craig ***CIDN*** : 23780200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SUITABLE ACOUSTIC AND FIRESTOP TECHNOLOGIES

The objective of this research is to develop a Best Practice Guide containing technical solutions for noise control and fire prevention that have been validated by a systematic review process. Although fire resistance and sound transmission ratings are available for a broad range of generic wall and floor assemblies, the building industry needs recognized solutions to ensure satisfactory performance in complete buildings. Accepted practice in one jurisdiction may be unacceptable in neighbouring provinces, or even in other cities in the same province. Designers, plan reviewers, builders, and inspectors, will benefit from a credible and broadly accepted set of solutions for appropriate sound and fire control with firestopping. Designs will be approved by a steering committee including partners from NRC, municipal governments and industry, and advisors from US and Canadian standards agencies. The guide will include details of firestops at service penetrations, barriers to restrict fire spread in concealed spaces, control of noise from plumbing and acoustic leaks at service penetrations. The project began in the autumn of 2004 and should be completed by March 2008.

CMHC Project Officer : *Barry Craig* ***CIDN*** : 32190200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

BUILDING SCIENCE BEST PRACTICES

The objective of this project is to consolidate current building science best practices into one comprehensive illustrated source that will serve as a text book and training manual for building science courses. It will be used in architectural programs at colleges and universities, and by builders and designers. The result of this research will be a common reference that describes essential building science for Canadian construction that is based on rigorous scientific research and testing, and that is focused on best practices. It will be tailored to existing teaching curricula and it will be extremely useful to architects, engineers and building scientists resulting in an accurate and common understanding of building science principles and their interrelationship with one another. The manuscript is expected to be complete in December 2008.

***CMHC Project Officer** : Barry Craig*
CIDN : 35610200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION TECHNIQUES AND PRACTICES FOR APPLICATION IN OTHER CLIMATES

The purpose of this research project was to demonstrate how to adapt Canadian wood-frame house construction techniques and practices in other countries with different climates. The resulting research report entitled "Durable Wood-frame Construction for All Climatic Zones: A Companion to Canadian Wood-Frame House Construction" is divided into three parts. The first part covers well-established building science principles for building envelope durability. The second part breaks new ground in the development of a series of methods that allows a designer or builder to select a particular wall construction based on local site conditions and climatic data drawn from a NASA weather data base maintained on the world wide web. The third part provides examples of durable wood-frame building assemblies for all climate zones found around the world. The report focuses on the durability of the building envelope, and covers other related aspects of construction (e.g. ventilation and termites). The final report is expected by March of 2008.

***CMHC Project Officer** : Barry Craig*
CIDN : 27290200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

GLOSSARY OF HOUSING TERMS - UPDATE

The purpose of this project is to review the current edition of Glossary of Housing Terms and conduct research to identify new terms and definitions which are missing. The Glossary of Housing Terms was last updated in 1995, resulting in the absence of a number of new housing terms, some of which are included in CMHC's new information products. A few examples of new housing terms missing from the Glossary of Housing Terms include: surfactants, enthalpy recovery ventilator, building science, polyolefin, xeriscaping, pyrite, stachybotrys chartarum and brownfields. All the existing terms and definitions have been reviewed to ensure they are still appropriate and that the definitions are accurate. Construction related acronyms and abbreviations, and terms common to large multiple unit residential buildings have been added. The revised Glossary of Housing Terms should be available in 2008.

***CMHC Project Officer** : Barry Craig*
CIDN : 33070200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

IMPROVED PREDICTION OF SEISMIC RESISTANCE OF PART 9 HOUSES

Currently available approaches for the prediction of seismic resistance of conventional wood-frame construction (that is, buildings conforming to Part 9 of the NBC) are not able to predict the seismic resistance in a reliable manner. Experience in earthquakes and recent shake table tests of two-storey specimens have demonstrated generally good performance, but the limitations of this favourable behaviour are not well defined. A funding grant from CMHC External Research Program has been provided to Forintek Canada Corporation (FP Innovations) to undertake a research project, to develop simple mechanics-based methods for the prediction of seismic resistance of conventional wood-frame ("Part 9") houses. The work under this grant will present a quantitative basis for possible Part 9 seismic provisions of the NBCC based on data from past and ongoing work at Forintek and pertinent data from the literature. The work will limit itself to regular geometric shapes of wood-frame construction and will not consider torsional seismic effects. The project is expected to be completed by fall of 2008.

CMHC Project Officer : *Silvio Plescia*	***CIDN*** : 34380208
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

REDESIGN PRODUCTION PROCESS IN HOUSING CONSTRUCTION USING LEAN PRINCIPLES AND VALUE STREAM MAPPING

The housing construction sector is distinguished from other parts of the construction industry and offers the closest analogy to the manufacturing industry. However, the home building process is still managed in the same way as in other sectors of the construction industry. The aim of this External Research Program project is to develop a lean process for housing construction that improves the efficiency and reduces overall throughput time.

CMHC Project Officer : *Barry Craig*	***CIDN*** : 36260202
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

SEISMIC PERFORMANCE OF WOOD-FRAME RESIDENTIAL CONSTRUCTION IN BRITISH COLUMBIA

The Earthquake 99 Project was a major research initiative undertaken at University of British Columbia. The main objective of this multi-year project was to evaluate and assess earthquake damage for residential wood frame construction by means of full-scale shaking table earthquake simulation tests. The goal of the project was to develop cost-effective guidelines and recommend changes to be made to current design and construction practices that would result in safe and better performance of residential construction during severe earthquakes.

The Earthquake 99 Project was supported by the following organizations: Simpson Strong-Tie Co., Inc., Forest Renewal BC, Natural Science and Engineering Research Council of Canada, Canada Customs and Revenue Agency, Canada Mortgage and Housing Corporation, National Research Council of Canada, British Columbia Ferry Corporation, the Advanced Systems Institute of BC and the UBC Department of Civil Engineering.

A financial grant from Canada Mortgage and Housing Corporation allowed Dr. Carlos Ventura and Dr. Timothy White both from the Earthquake Engineering Research Facility, Department of Civil Engineering, University of British Columbia, to analyse and evaluate in detail all the shake table data obtained during the experimental part of the Earthquake 99 project and use this information to calibrate and refine computer models of wood frame residential construction, which can be used to determine the expected seismic performance of British Columbia construction during severe earthquakes.

The CD-ROM includes selected videos, photos, the report appendices and the following documents:

- The Earthquake 99 Project: Seismic Shake-Table Testing of Wood-Framed Residential Construction. Prepared by Carlos E. Ventura and Graham W. Taylor (2003)
- Earthquake 99 Project: Laboratory Test Results Volume I Edition I Overview Report. Prepared by TBG Seismic Consultants Ltd. (2002)
- Static and Dynamic Earthquake Testing of Rainscreen Stucco Systems for British Columbia Residential Wood Frame Construction. Prepared by G.W. Taylor, H.G.L. Prion, C.E. Ventura and M, Kharrazi. Revised. (2003)
- Vibration Characteristics of Single-Family Woodframe Buildings. Prepared by Mehdi Hadj Karim Kharrazi (2001)
- Report: Soil Hazard Map of the Lower Mainland of British Columbia for Assessing the Earthquake Hazard Due to Lateral Ground Shaking. Prepared by Patrick A. Monahan.
- Seismic Performance of Wood-Frame Residential Construction in British Columbia EERF Report no. 06-02 Suggested Minimum Strength Requirements. Prepared by Dr. Timothy White and Dr. Carlos Ventura (2006)
- Seismic Performance of Wood-Frame Residential Construction in British Columbia EERF Report no. 06-03 Technical Report. Prepared by Dr. Timothy White and Dr. Carlos Ventura (2006)
- Static and Dynamic Testing of Shear Wall Panels for Typical Wood Frame Residential Construction in British Columbia. Prepared for TBG Seismic Consultants Ltd. by Jachym Rudolf, Dr. Carlos Ventura and Dr. Helmut Prion
- Seismic Performance of Rainscreen Stucco. Prepared by Graham W. Taylor ... et al.
- Report: Soil Hazard Map of Greater Victoria for Assessing the Earthquake Hazard Due to Lateral Ground Shaking. Prepared by Patrick A. Monahan.

CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2007. 1 CD-ROM

STATUS : New Completed CD-ROM

AVAILABILITY : Canadian Housing Information Centre

SEISMIC UPGRADES TO LOW-RISE HOUSING

This research project proposes to formulate practical applications for the research results of the industry-leading multi-year research project referred to as the Earthquake 99 Project, a collaborative effort between TBG Seismic Consultants Ltd. and the Department of Civil Engineering at the University of British Columbia. The objective of this project, undertaken by TBG Seismic Consultants Ltd., is to formulate options for improving the earthquake preparedness of low-rise residential wood frame housing in British Columbia. Both new and existing single family and multi-unit wood frame construction will be investigated. To set the context for the examination of improvements in earthquake preparedness through seismic upgrading, this project will first examine the different housing construction types commonly found in British Columbia. Design earthquakes and soil amplification for the south-west corner of the province will be examined as a precursor to the detailed evaluation of the earthquake damage potential for the range of housing types. This project is expected to be completed by spring 2008.

CMHC Project Officer : *Silvio Plescia*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 25380200

STATUS : Ongoing

HOUSE CONSTRUCTION

SEMINARS ON THE TECHNICAL CHANGES IN THE 2005 NATIONAL CONSTRUCTION CODES

The Canadian Commission on Building and Fire Codes (CCBFC) completed the latest updates to the model national codes and published the revisions in September, 2005. The new Model National Codes contain substantial changes and a new objective-based approach to fulfilling the building requirements. Architects, engineers, builders, inspectors and building officials will benefit from training in the changes to the new codes, and the protocols for proposing new approaches to fulfill the requirements of the codes. The training is tailored to the needs of the Atlantic Provinces and identifies the specific adaptations each province makes to the model code. CMHC contributed to the development of two day seminars on the changes in the 2005 Model National Codes being developed by the Atlantic Home Building and Renovation Sector Council (AHBRSC) with support from the Canadian Home Builders' Association (CHBA), and offered to builders and renovators, building officials, inspectors, architects and engineers. A course manual was prepared and seminars were offered in several cities in the Atlantic Provinces during 2007.

CMHC Project Officer : *Barry Craig* **CIDN** : 34190200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is available

HOUSING RESEARCH

CONTRIBUTION TO RESEARCH PROJECTS AT THE CANADIAN CENTRE FOR HOUSING TECHNOLOGY

In co-operation with NRC and NRCan, CMHC will continue to support research projects to evaluate energy efficiency technologies on the performance of the test houses at the Canadian Centre for Housing Technology (CCHT). Several technologies have already been evaluated at the facility, and research reports are available from the CCHT web site http://www.ccht-cctr.gc.ca/documents_e.html. CMHC Research Highlights on 5 of these projects are available from CMHC's Web site. Several other projects are being considered for testing and evaluation by the CCHT's Research Committee, which represents the three partners, Canada Mortgage and Housing Corporation, Natural Resources Canada and the National Research Council of Canada.

CMHC Project Officer : *Ken Ruest* **CIDN** : 32090200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

INDOOR ENVIRONMENT

CMHC PARTICIPATION IN THE HEALTHY INDOORS PARTNERSHIP (HIP)

This project is a collaboration between government, industry and the private sector to implement the Healthy Indoors Partnership (HIP) vision and business plan for improving indoor environmental quality in Canada. The mandate of the Healthy Indoors Partnership, incorporated in 2003 as a not-for profit organization, is to bring industry, government and nongovernment organizations together to identify, develop, implement and manage activities, such as inter-agency research, designed to create healthier indoor environments in Canada. CMHC will collaborate on HIP Indoor

Air Quality consultation. In May 2004 the HIP released proceedings from an expert/stake holder consultation on mold in the indoor environment. HIP has also held round tables on filtration in residential dwellings and produced a buyer's guide for consumers in the fall of 2006. A round table on Low Emissions Materials, Products, and Services was held in February 2007. Consumer and industry guides will be produced on this subject and should be available in late 2007.

CMHC Project Officer : *Ken Ruest* **CIDN** : 30510200

Division : Policy and Research Division **STATUS** : Ongoing

AVAILABILITY : Product is not yet available

INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT

CMHC has contributed to a study investigating the relationship between indoor air quality and severe respiratory tract infections in Inuit infants in Baffin region, Nunavut. The initial work was carried out in conjunction with the Children's Hospital of Eastern Ontario, Health Canada, Natural Resources Canada, the Nunavut government and Nunavut health and housing agencies. Testing took place over the winter of 2003 in 20 houses in Cape Dorset. It included air quality measurements, blower door testing, and long term air change rate measurement. These results show that some of the houses are under ventilated, but that air quality is similar in many aspects to more southern housing. A follow-up project with the partners explored ventilation solutions in Nunavut communities. The second phase surveyed air change rates, carbon dioxide levels, and occupancy factors in 100 houses in four Nunavut communities, to see if the Cape Dorset results are typical. Low ventilation rates were measured in many of the houses and corresponding high CO2 concentrations resulted. A CMHC Research Highlight on the pilot project and the 100 house survey has been issued ("Nunavut Housing Ventilation Research 2003-2005", Research Highlight Technical Series 05-116). The current phase involves the installation of HRVs in 100 existing Nunavut houses and an analysis of the effects on occupant health. The project team hoped to have the HRVs installed in the fall of 2006, with the health monitoring taking place over the winter of 2006/2007. However, problems with weather, contractor performance, equipment installation, and finding test houses delayed the work. Currently, there are about 63 HRV units installed in four communities. Their operation is being verified in the fall of 2007, and the occupants' health will be monitored over the winter of 2007-2008.

CMHC Project Officer : *Don Fugler* **CIDN** : 27570200

Division : Policy and Research Division **STATUS** : Ongoing

AVAILABILITY : Research highlight is available

LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE

This initiative delivers information on indoor air quality in the home to targeted audiences, the end result of which will benefit Canadian homeowners and occupants. Basic information to increase awareness and appreciation of indoor air problems is through the one-day Let's Clear the Air seminar (for housing and health professionals) or the Build and Renovate to Avoid Mold workshop (for builders, renovators, architects, real estate and insurance appraisers). A second day consisting of a site visit to a home with an IAQ expert demonstrates the IAQ investigation method. Qualified individuals can proceed to the CMHC Residential Indoor Air Quality Investigator Training Program. Individuals who complete the training program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact Virginia Salares (e-mail vsalares@cmhc.ca, tel 613 748-2032, fax 613 748-2402), for admission requirements and application forms. For referral purposes, a list of persons having completed the training is available from CMHC offices.

CMHC Project Officer : *Virginia R Salares* **CIDN** : 16230300

Division : Policy and Research Division **STATUS** : Ongoing

AVAILABILITY : Seminar/training is available

OIL-FIRED APPLIANCE DEPRESSURIZATION SPILLAGE TESTING

It has been impossible to find oil-fired equipment designed to work in houses with negative pressures. House depressurization can cause combustion, which creates objectionable odours and may have health implications. This research report relates how one manufacturer of oil appliances investigated solutions for spillage and odours.

Spillage from combustion appliances in Canadian homes is a complex problem. The frequency and severity of combustion spillage is affected by the airtightness level of the house, the way the equipment is installed and the use of other air-exhausting equipment in the home. Other air-exhausting equipment can overpower the appliance venting system and cause combustion spillage.

Existing Canadian codes and standards have attempted to deal with combustion spillage by such strategies as requiring makeup air supplies for installations that may not have sufficient air leakage to support the proper operation of the combustion appliances.

Manufacturers have also developed appliances that are more spillage resistant. However, there is no standard protocol to directly test and rate products for resistance to combustion spillage. Manufacturers have not had an accepted way to notify consumers, builders or other stakeholders of the rated spillage resistance of their appliances, or to indicate which of their products perform better under reduced pressure conditions that might cause spillage in other products. The depressurization-spillage test was developed by Canada Mortgage and Housing Corporation, Natural Resources Canada and other stakeholders as a key instrument in addressing this gap.

Kerr Heating Products of Parrsboro, N.S., partnered with CMHC and NRCan to develop its in-house capabilities for evaluating the spillage resistance of oil-fired appliances. During the project, Kerr installed, commissioned and used an in-house depressurization spillage test facility.

The facility, the test procedure and calculations were similar to those that were used for natural gas appliances in an earlier CMHC project. This project is the first time that any Canadian HVAC (heating, venting and air conditioning) manufacturer has expanded its product development capabilities by building and using in-house depressurization-spillage testing tools. It was also the first time that the test had been used with appliances intended for vertical (chimney) venting. The Kerr team updated the calculations from the earlier gas-fired project to incorporate the correct fuel composition for oil-fired equipment. Kerr evaluated several design alternatives and instrumentation choices for the test room. The full project report explains the decisions and provides full details for the updated test procedure and its associated calculations. Performance measurements for some residential oil-fired combustion appliances are provided at different depressurization levels. Kerr provided a template to enable other appliance manufacturers to readily deploy their own in-house depressurization testing capabilities.

This research project focused on identifying challenges for a manufacturer implementing the spillage test. The manufacturer has to overcome these barriers and take the test from a laboratory setting (where it has already been proven to work) to its own product development environment. This project also produced test results on the combustion-spillage performance of some oil-fired heating products with a range of different vent configurations and components.

Prepared by Kerr Heating Products. Project Team: William Spencer, Janusz Pawlus, Peter Edwards (Peter Edwards Co.) CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2006. 31 pages (775 KB)

Note: No. 07-109 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65365)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Oil_Fired.pdf

RADON REMEDIATION DEMONSTRATION: A CASE STUDY

The Radiation Protection Bureau of Health Canada (HC) has released a new, lower radon guideline (200 Bq/m^3) and is planning to increase public awareness of radon risks. HC has also had drafted a protocol for radon remediation in houses to help homeowners and contractors solve radon problems. Before general release of the protocol, HC will pilot its use on a high-radon house to ensure that the recommendations and sequencing are appropriate for Canadian conditions. CMHC will help the project by managing the research field work and providing building science and other technical support to the testing, remediation work, analysis and reporting. The field work should start in the fall of 2007 with a report expected early in 2008.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 36460200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

RESIDENTIAL MARIJUANA GROWING OPERATIONS AND CLANDESTINE NARCOTICS LABORATORIES - HEALTH AND SAFETY ISSUES FOR CONSUMERS AND IMPLICATIONS FOR CMHC

CMHC undertook a study of the extent of damage and contamination due to mold or chemicals in houses that have been used for growing marijuana. A first phase study of twelve grow houses has shown the lack of uniformity and unnecessary costs involved in the methods of assessment that are presently employed. Damage to the houses from neglect or disconnection of hydro can be more serious than from the growing operation. Health and safety issues have been identified to better inform consumers buying homes previously used to grow marijuana. The study also identified the need for a standardized protocol for assessing grow houses and a method to ensure that proper remediation is carried out.

Note: No. 07-101 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65336)

STATUS : Completed Research Highlight

AVAILABILITY : CMHC web site

REVIEW OF THE RELATIONSHIP BETWEEN HOUSE VENTILATION RATES AND HEALTH

This work would attempt to establish the relationship between adequate ventilation and health (or inadequate ventilation and poor health), through literature searches and appropriate field testing. The project should lead to a better understanding of the relationship between house ventilation and occupant health. If the project establishes a strong correlation between good ventilation and healthy residents, it will be useful material for building codes, medical authorities, ventilation standards, and the ventilation industry. Currently, CMHC is investigating the possibility of coordinating this research with the Canadian Institute for Health Research (CIHR) or the Quebec public health agency (INSPQ) to see if their planned research projects would complement CMHC's objectives.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 35560200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

INDOOR ENVIRONMENT

TESTING THE DEPRESSURIZATION RESISTANCE OF GAS AND OIL FURNACES

CMHC and NRCan have been cooperating in the development of a test protocol for determining the spillage resistance of residential combustion appliances. There has been initial testing of both gas and oil appliances. The test protocol and structure is relatively simple and robust. Some appliances are able to operate under high levels of depressurization better than others. This research project will extend the current results in gas and oil appliances through supplemental testing of a wider range of appliance types and makes, with the eventual goal of integrating depressurization testing into appliance standards. The 2007 research will include the laboratory testing of another 10 gas-fired appliances, plus a possible test of a vertically-vented, mid-efficiency oil furnace with improved spillage resistance.

CMHC Project Officer : *Don Fugler* ***CIDN*** : 36030200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

YEARLY VARIATION IN BIOLOGICAL CONTAMINANTS

Ten houses that have previously been characterized for biological contaminants during the winter have been retested a year later to determine the variability of microbiological markers. The data is being analyzed to identify climatic and other factors that may affect year to year measures of biological contaminants in houses. The validity of "one point in time" testing to characterize multi-year biological contaminant loads in houses during the winter will be assessed. This project will increase knowledge of yearly winter variations in microbiological loads in houses, and of testing procedures that provide the most repeatable long term building microbiological markers. One potential outcome would be the confirmation that CMHC's methodology of assessing IAQ problems by inspection alone is still the most accurate assessment of biological contamination without expensive testing or lab analysis. This may also indicate which testing methodology represents the most stable indicator of long term biological indicators in houses. The results will be available in early spring 2008.

CMHC Project Officer : *Ken Ruest* ***CIDN*** : 32160200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

See also: INDOOR AIR QUALITY TROUBLESHOOTING GUIDE FOR PROPERTY OWNERS AND MANAGERS, p. 52

MANUFACTURED HOUSING

FEASIBILITY OF UTILIZING A PORTABLE HOUSING PLANT FOR SINGLE FAMILY-DETACHED CONSTRUCTION

This External Research project is studying the economic feasibility of using an automated, mobile plant to produce houses that are 90-95% complete when they leave the plant. The plant would be erected in the subdivision where the houses are to be built (with basement foundations pre-installed), and once the construction program is complete, the plant would be dismantled and shipped to the next locale. The final report has been received and has been reviewed by the Manufactured Housing Institute Canada and the Federation of Canadian Municipalities. The report is being edited and layouts for a typical community master plan are being developed, including alternate street designs and mobile plant locations. The project is expected to be completed by late 2007.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 23050201

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

CONTRIBUTION TO THE INDUSTRIAL RESEARCH CHAIR IN ALLERGENS AND TOXINS FROM MOLDS IN THE BUILT ENVIRONMENT

There is no method to obtain a quick and inexpensive determination of the nature of mold contamination in a house. A more fundamental understanding of the by-products of mold that are harmful to people is needed along with knowledge regarding the thresholds that should be avoided and cheap and reliable ways of classifying moldy and non-moldy houses. CMHC is supporting the ongoing research of the National Science and Engineering Research Council Chair on Allergens and Toxins from Molds in the Built Environment at Carleton University. The first five years work of the Chair developed the expertise to identify human allergens, produce antibodies specific to each allergen and isolate and test the effect of toxins on lungs from Stachybotrys chartarum, Aspergillus versicolor and Penicillium chrysogenum, three representative fungi found in houses that require large, medium and low amounts of moisture. The second five years, starting in June 2006, will expand the expertise to a larger number of molds to make it feasible to use these reagents as a cheap and reliable way of testing for mold contamination in houses.

CMHC Project Officer : *Virginia R Salares* **CIDN** : 34070200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

DEVELOPMENT AND ASSESSMENT OF CRAWL SPACE REMEDIATION STRATEGIES

This External Research Project investigated the performance of 8 Prairie crawl spaces that have been retrofitted in the last several years to deal with moisture problems. The series of case studies included the nature of the initial problem, a description of the remedial measures applied, and an analysis of the success (or failure) of these measures following a site investigation. To a large degree, the retrofits have proven successful at ensuring dry, healthy crawl spaces in these Saskatchewan buildings.

Prepared by Figley Consulting Associates Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2007. (External Research Program Research Report) 1 CD-ROM

STATUS : New Completed CD-ROM (13144 KB)
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Dev%20and%20Asses_crawlspace(W).pdf

DEVELOPMENT OF DRIVING RAIN MAPS AND LOADS FOR CANADA

The amount of water deposited on the above-grade building envelope by driving rain is larger than any other source of moisture in almost all building types and climates. Both the deposited rain absorbed by the cladding and water penetration of the cladding can be a significant source of moisture for many deterioration mechanisms. The objective of this External Research project, undertaken by Prof. John Straube, University of Waterloo, is to develop quantitative estimates of the driving rain load in the various climates across Canada. The project will review the nature of rain and wind and explore the mechanisms involved in wind-rain-building interactions. The rain-wind-building interaction is considered in four parts: the nature of rain, the coincidence of wind and rain at the site, driving rain, and the interaction between buildings, wind and rain. This project is expected to be completed by spring of 2008.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 26470207
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

DRAINAGE AND RETENTION OF WATER BY CLADDING SYSTEMS

CMHC proposed that a series of drainage tests of exterior cladding assemblies be undertaken to produce data to quantify the ability of several types of cladding and methods of application on wall systems to manage and evacuate water that has intruded behind them. The original request was that the study focus on the drainage characteristics of the tested systems. However, it was clear that the primary focus should be the amount of water that is retained and how it might dissipate.

The reports are organized by the wall types tested and with additional supplementary tests done in support of the work. The different "Parts" of reporting in this project are:

Part 1 – Experimental Approach and Plan: details the experimental plan devised;
Part 2 – Testing and Measurement Methodologies: details the testing and methodologies employed;
Part 3 – Drainage Testing of EIFS Wall Systems: details the testing and analysis of the EIFS reports;
Part 4 – Drainage Testing of Vinyl Siding Test Walls: provides the results of tests on vinyl clad siding systems;
Part 5 – Drainage Testing of Wood and Fibre-Based Siding Wall Systems: provides the results of tests on wood based siding and fibre-cement board testing;
Part 6 – Air Flow Characteristics of Drainage Cavities: provides the results of air flow testing of the walls with drainage cavities to characterize the air flow resistance of those cavities both in the main portion as well as at the exit;
Part 7 – Air Tightness and Vapour Permeance of Joints in Siding Systems: provides the results of air flow testing and water vapour transmission tests of joints in large siding samples constructed for this purpose;
Part 8 – Summary Report: represents a summary and concluding analysis of testing and results that have been reported on separately for different wall systems and is an overview of the findings of the entire project.

Reporting was compartmentalized into this series of "Parts" because of the extensive detail involved in reporting on the many wall variants that have been included. Comparisons were considered more manageable for the reader to face by providing the details separately in each segment of the work.

Part 1 – 6 prepared by Donald M. Onysko and Constance Thivierge; Part 7 prepared by Donald M. Onysko and Marcin Pazera; Part 8 prepared by Donald M. Onysko. Forintek Canada Corp., Building Systems Department. CMHC Project Officer: Barry Craig. Ottawa: Canada Mortgage and Housing Corporation, 2007. 8 parts contained on 1 CD-ROM

STATUS : New Completed CD-ROM
AVAILABILITY : Canadian Housing Information Centre

HOW IMPORTANT ARE DEHUMIDIFIERS IN PREVENTING MOLD IN HOUSES?

This study will test the effectiveness of dehumidifiers in managing relative humidity in basements. Measurements of relative humidity and moisture readings of selected surfaces will be taken in houses of varying ages and characteristics when a dehumidifier is running and when it is turned off. A pilot study of three matched houses in the same area, conducted in the fall of 2004, has recommended that houses in three regions - Ontario/Quebec, BC/Atlantic and Prairies, be studied over a full year period with dehumidification when needed. A larger study will monitor 30 houses in different regions for one year without dehumidification and a second year with dehumidification. The project started in October 2005 and will finish in December 2007.

CMHC Project Officer *: Virginia R Salares*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 32170200
STATUS : Ongoing

MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM

The objective of this project is to modify and upgrade WALLDRY, a 1980's computer program developed by CMHC, which models the flows of moisture, heat and air through wood-framed outer wall assemblies in response to given external climatic loads and interior temperature and humidity conditions. The original QBASIC code used in WALLDRY will be recast using a Windows-based computing language to overcome the memory management limitations inherent in a DOS based program. The upgrades would also incorporate corrections applied to any of the algorithms from the use of WALLDRY in recent simulation studies, programming enhancements in a user-friendly environment, including input capabilities and a material properties database, and to provide a more useful means of presenting the output of interest. Project completion is expected by spring 2008.

CMHC Project Officer *: Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 25050200
STATUS : Ongoing

MOLD REMEDIATION WORKSHOP

The focus of the Remediating Mold workshop is on information required by builders and contractors involved in renovation and clean-up of mold contaminated houses. As a result of rapidly evolving knowledge in this field, the workshop incorporates current and substantive information from authoritative sources. This workshop will address mold cleanup in general and will include information on the precautionary measures required to protect workers and occupants, and present best practices for mold remediation.

CMHC Project Officer *: Virginia R Salares*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 23800200
STATUS : Ongoing

UNDERSTANDING VAPOUR PERMEANCE AND CONDENSATION IN WALL ASSEMBLIES

This research investigated the significance/insignificance of potential moisture problems due to plastic sheeting as a vapour barrier in above-grade and basement wall assemblies. The research aimed to outline cases where performance can be improved, and changes that could reduce inappropriate use. Finally, the research looked at the benefits/risks with polyethylene sheeting with clearer delineation of the situations in which it is necessary, potentially damaging, or unimportant.

This report presents key findings from the research work and field tests within the following framework:

- A literature review;
- Field testing of four common basement wall assemblies (with and without polyethylene sheeting) in a southern Ontario home;
- Field testing of six common above-grade wall assemblies (with and without polyethylene sheeting) in the University of Waterloo test exposure facility (BEGHut);
- Comparison of the field testing data and computer models, to provide validation of the model against this installation;
- Extending the test results to broader practice across Canada through computer modeling.

Field testing and simulation results show that low permeance layers make sense in some situations and not others. Moisture issues could arise in certain situations with low or high permeance interior vapour control layers. This research gives guidance on the situations where polyethylene sheeting is or is not a problem, and regarding appropriate vapour permeance levels for walls in different geographical areas.

Prepared by Halsall Associates Ltd. and University of Waterloo. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2007. 1 CD-ROM

Note: No. 07-123 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65843)

STATUS : New Completed CD-ROM and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Vapour_Permeance_Volume_1_Web_sept5.pdf (Volume 1 - 2695 KB)
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Volume_2_Appendix_Web_sept5.pdf (Volume 2 - 18469 KB)

WATER PENETRATION THROUGH THINNER VENEER WALL

Ryerson University was awarded a grant, under CMHC's External Research Program, to undertake this research project to study the potential for reducing the thickness of masonry cladding (or redesigning masonry units to be lighter and use less material) and still maintain acceptable durability and water penetration performance. The project will focus on issues of resistance to water penetration and durability and will specifically investigate the impact of dimensional changes on the water penetration into the wall (air) cavity. The project is expected to commence by end of October 2007, with completion expected by end of summer 2008.

CMHC Project Officer : *Silvio Plescia*
CIDN : 36260215
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

WIND-RAIN RELATIONSHIPS IN SOUTH-WESTERN BRITISH COLUMBIA

Building envelope failures in Southwestern British Columbia have brought to light the strong influence of wind-driven rain on building envelopes. This study examines wind and rainfall data collected throughout the year from 12 meteorological stations: four on Vancouver Island and eight in the Lower Mainland. Results indicate that prominent wind directions during rain, as well as maximum wind speed, vary with location. Furthermore, all stations exhibited a marked difference in the wind direction and frequency of higher wind speeds for wet hours versus all hours.

Note: No. 07-114 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65546)

STATUS : New Completed Research Highlight

AVAILABILITY : CMHC web site

See also: IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL ASSEMBLIES, p. 33
Items in the Building Materials section, p. 12-15

CMHC CONTRIBUTION TO THE COLD CLIMATE HOUSING FORUM

The Cold Climate Housing Research Centre in Fairbanks, Alaska is hosting 'Sustainable Northern Shelter in A World of Diminishing Resources', the first biennial forum on Sustainable Northern Shelter on October 29 and 30, 2007. The conference is being organized to bring northern housing experts together from across the circumpolar region to explore issues, solutions and proposed future research in northern housing. The conference will address areas that include energy efficiency, sustainable buildings, building science, materials, alternative energy, infrastructure, and the design of northern houses and communities. It is intended that the conference be the first of an ongoing series of northern conferences to occur every other year in different circumpolar regions and countries.

CMHC Project Officer *: William Semple*	**CIDN** : 36170200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

FEASIBILITY OF ALTERNATIVE ENERGY EFFICIENT HOUSING SERVICES FOR THE COMMUNITY OF NORMAN WELLS, NWT

This project will evaluate the feasibility of using decentralized services for a proposed small cluster of new houses in the northern community of Norman Wells, NWT. It will evaluate the infrastructure needs for the housing, evaluate the potential for an alternative infrastructure system (e.g. Economad) and make recommendations on alternative systems that could be installed to meet the growing needs for services for housing in the community. This will include the evaluation of the potential for heating with district heating provided by a co-generation plant (either diesel or natural gas fired) with the waste heat being used to heat the houses. As an additional innovation the cluster would be grid connected to provide an electricity back-up and as a demonstration of distributed generation. Based on the recommendations, the study will evaluate the ability of the community to successfully install, operate and maintain the systems. Based on expected energy and other operating costs, the study will include a cost benefit analysis of the alternative systems. The project will be the first phase of a two stage project that will subsequently include the monitoring of the energy and cost effectiveness of the installed decentralized infrastructure systems, if these are selected to supply services to new housing in the community. This project will increase the level of knowledge concerning the viability of alternative systems for the supply of services to northern communities. This project will form part of "Evaluation of Local Building Services serving Clustered Housing in Northern and Remote Communities". The project will begin in late 2006 with a report available in mid 2007.

CMHC Project Officer *: Duncan Hill*	**CIDN** : 33270200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

INNOVATIVE USE OF SHIPPING CONTAINERS FOR SHELTER HOUSING

This two stage project will first assess the feasibility and acceptability of providing shelter for the homeless on a seasonal or as required basis using recycled shipping containers (or other prefabricated components) suitably modified for Canadian housing needs. The project will proceed to a second stage if the approach appears suitable and cost effective for either or both southern and northern communities. Demonstration shelter units will be serviced by micro utility modules (or external utility rooms) according to on site infrastructure needs. All components of the project will be portable and relocatable as the need or demand indicates, as well as being aesthetically acceptable and fully functional. The project will demonstrate a low cost portable system to provide seasonal shelter of good quality for the homeless, but is not intended as a replacement for long term conventional housing.

CMHC Project Officer *: Duncan Hill*	**CIDN** : 31890200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

INTEGRATED DESIGN AND EVALUATION OF A CONSTRUCTED NORTHERN SUSTAINABLE HOUSE (E/2 PROTOTYPE)

In this partnership project, two "Sustainable Northern Houses" have been designed by CMHC in partnership with a Tr'ondek Hwech'in First Nations community in the Yukon and the Nunavut Housing Corporation in Arviat, Nunavut. The houses have been designed and will be constructed to consume less than 50% of the Model National Energy Code of Canada for Houses energy requirements, and are suited to the northern culture and lifestyles of the communities where they will be built. The project has incorporated knowledge and connections that were gathered in northern design charrettes, with the design work for each Sustainable Northern House carried out in consultation with the northern community and territorial northern housing provider, and will be included in the evaluation of the Sustainable Northern House Prototype. The evaluation of the project will include monitoring the energy performance of the constructed houses, carrying out a cost/benefit analysis of the energy savings of each Sustainable Northern House vs. a typical new house in the community, and carrying out an analysis of the success of the cultural issues being addressed in the design. CMHC has facilitated design workshops, been the lead in designing the houses, and will undertake the performance evaluation of the Sustainable Northern House Prototypes. The project is sponsored in part by the Program for Energy Research and Development (PERD). The research will be completed by December 2009.

CMHC Project Officer : *William Semple*
CIDN : 33240200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

INTEGRATED DESIGN PROCESS IN THE NORTH

The project involves working with northern communities, and northern housing agencies to integrate community housing needs, building design, construction and delivery to support sustainable northern development. In some communities this project will support elders visioning sessions designed to assist with identifying community priorities. Residents will be consulted to identify their housing needs and desires as well. In communities where design charrettes have been carried out, the project will support additional workshops on specific sustainability issues, innovative products and strategies to address these issues, and could include research support, monitoring and quality assurance of specific green technologies such as water harvesting, ventilation design, culturally appropriate building design, demonstrations and training, etc. Priority will be given to communities that are ready with sustainable development initiatives and to support the results from previous charrettes. Community commitment will be an important element for all the initiatives. This project will provide a supportive framework to assist in establishing a community vision of sustainability prior to building and community design charrettes, will provide a follow up to community design charrettes by assisting and facilitating work to move from concept to more specific plan, assisting the community in developing an implementation strategy for its sustainability initiative.

The first Integrated Design Process (IDP) project has been carried out in the design of two versions of the Sustainable Northern House prototype, -- culturally sensitive, energy efficient houses that are to be built in the communities of Dawson City, Yukon and Arviat, Nunavut. The IDP project will document the use of design charrettes, the design process carried out by the design teams, and input from the charrette participants on the design process and the house designs for each community. The Sustainable Northern House IDP project will be completed by the end of December 2007 with a report available in early 2008.

CMHC Project Officer : *William Semple*
CIDN : 35740200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

REDUCING ENERGY USE OF NORTHERN HOUSING BY HALF - PART 3: BUILDINGS AND COMMUNITIES / INTEGRATED DESIGN CHARRETTES FOR SUSTAINABLE BUILDINGS AND COMMUNITIES

As part of the intergovernmental strategy to reduce energy requirements in the North and improve housing conditions, Integrated Design Charrettes are being carried out in northern communities with the residents/builders and community leaders with the goals of sustainable improvements and lower costs in their buildings and communities. The strategies generated from this initiative will enable northern communities to reduce energy and water costs significantly. This project involves the organization and facilitation of community design charrettes in northern communities to formulate improved solutions to meet their evolving housing needs. The charrettes provide an opportunity to align the thinking of various experts, community builders, local inhabitants and municipal leaders about the potential for the design and construction of sustainable northern housing as well as a thorough discussion of the barriers and challenges that must be overcome. It will also provide a technique for northern communities to rethink their community plans, their process of design and better northern housing delivery options using sustainable objectives which are adapted to their needs. The charrettes will be completed by the end of 2008. A report documenting the outcome of each or all charrettes will be available following each event. The most recent charrette Research Highlights from Arviat and Yellowknife are available on-line. The full report of the charrette organized with the City of Whitehorse is available from the Canadian Housing Information Centre (see abstract p. 52).

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 33690200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is available on the web

SUSTAINABLE NORTHERN COMMUNITY DEVELOPMENT CHARRETTE IN YELLOWKNIFE, N.T.

A charrette (design workshop) sponsored by Canada Mortgage and Housing Corporation, was held May 17 to 19, 2005 in Yellowknife, NT. The objective was to explore the issues of northern community development and to suggest specific solutions to achieve a sustainable and high quality of life.

This charrette focused on the particular challenges and opportunities of sustainable development for Negus Point, a 100-acre city-owned property in Yellowknife. The integrated design teams explored the potential of on-site wastewater treatment and geothermal water-sourced district heat; pedestrian, bike and ski trails in low-lying areas; and protection of the fragile northern ecosystem in a development that would include various forms of housing to meet the needs of the growing population, with small commerce, community services and research demonstration facilities.

Research Consultants: Guy Architects. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2007. 47 pages (3494 KB)

Note: No. 07-113 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65322)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Sustainable_Northern_W.pdf

WHISTLE BEND PLANNING STUDY

Whitehorse's 2002 Official Community Plan identified the Whistle Bend area as the next logical location for large-scale residential development, to be developed over the next 20 years, for as many as 10,000 new residents. Drawing on lessons learned from public reaction to infill proposals, the City of Whitehorse chose a charrette to generate an innovative design solution to address multiple objectives and divergent interests, all in the spirit of sustainability.

The Whistle Bend Planning and Design Charrette was held in partnership with CMHC from November 5 to 9, 2006, and attracted 70 participants. The charrette set a new standard for public consultation in Yukon by inspiring broad-based community participation and involvement of multi-disciplinary expertise in development of a smart growth design concept for Whistle Bend. The plan developed is based firmly on the principles of smart growth including mixed land use, densities to support transit and pedestrians, diverse housing forms, and the protection of green space. This report is the story of how that was done.

Prepared by the City of Whitehorse Planning Development Services. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2007. 57 pages (6846 KB)

Note: No. 07-115 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65649)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_Whistley_study(w).pdf

See also: SUSTAINABLE HOUSING IN THE NORTH, p. 74
INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT, p. 41
ENGINEERED BUILDING ENVELOPE SYSTEM FOR OUTDOOR/INDOOR CLIMATE EXTREMES, p. 30

PROPERTY MANAGEMENT

INDOOR AIR QUALITY TROUBLESHOOTING GUIDE FOR PROPERTY OWNERS AND MANAGERS

A guide for identifying and resolving indoor air quality problems in multi-unit residential buildings will be developed for property owners and managers. The guide will provide instructions for detecting, identifying and resolving common problems relating to the indoor environment in both common areas and individual apartments. Information will also be provided as to when such activities should be referred to an expert. The guide is primarily directed at owners and managers but the information on specific problems and solutions will be presented in such a way that it could be provided to the occupants of individual apartments. The project will be completed in late 2007.

CMHC Project Officer : *Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 3050-PLN03

STATUS : Ongoing

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE PHASE II

The overall objective of this multi-phased Canadian Home Inspector and Building Official (CHIBO) national initiative is to raise the level of competency of the private home inspection industry, the municipal building officials, and the First Nations building officers and establish a qualified and recognizable industry to better serve their clients. Phase I activities resulted in the development of Occupational Standards for each of these sectors. Phase II, which built on the results of the Phase I, is now complete. The primary objectives of Phase II, to develop certification and accreditation models for the inspection industry, have been met. The certification and accreditation models were to be implemented by the industry sectors in 2006. Technical Research Highlight 04-112 summarizes this research project and is available on the CMHC Web site. The certification and accreditation for the Building Officials is being implemented in 2007.

CMHC Project Officer : *Ken Ruest* **CIDN** : 25150200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Research highlight is available

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS (CHIBO) - PHASE III NATIONAL INSPECTION INITIATIVE

The purpose of this partnership project is to assist the Alliance of Canadian Building Officials' Association (ACBOA) to implement CHIBO developed models for national accreditation and certification of building officials. CMHC support is being used to pilot the certification model, to develop necessary application assessment tools, to establish governance committees and boards as required by the certification models. The implementation of the National Certification and Accreditation program for municipal building officials will help to harmonize the knowledge and experience requirements for building officials and enhance the capacity and standing of the building officials' industry in Canada. The implementation of the National Program is to be completed by the end of March 2008.

CMHC Project Officer : *Ken Ruest* **CIDN** : 35040200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ***NEW***

SUPPORT FOR THE DEVELOPMENT OF INFRASTRUCTURE TO IMPLEMENT THE NATIONAL CERTIFICATION AND ACCREDITATION MODEL FOR HOME AND PROPERTY INSPECTORS

This project is a contribution to the Canadian Association of Home and Property Inspectors (CAHPI) to assist in the development of the infrastructure required to administer the National Certification and Accreditation program for Home and Property Inspectors. The pilot and implementation phase of the project is now completed. The program was offically launched in November 2006, and all home inspectors are invited to apply to become National Certificate Holders. Information about the certification program can be obtained from CAHPI's web site at www.cahpi.ca. Additional background information on the development of this national initiative may be found in the CMHC Research Highlight: Canadian Home Inspectors & Building Officials National Initiative (Order no. 62629).

STATUS : Completed

AVAILABILITY : Research Highlight is available on the CMHC web site

See also: Socio-economic research on Renovation and Inspection, p. 102

ADVANCEMENT OF COMPETENCY IN INTEGRATED SUSTAINABLE BUILDING DESIGN - SUPPORT OF CONCORDIA UNIVERSITY IN THE 2005 'SOLAR DECATHLON'

In this project, and as one of various contributors, CMHC supported the Canadian team entry led by Concordia University to participate in the 2005 Solar Decathlon in Washington D.C. Based on a preliminary competition, nineteen teams were selected to participate in this event; the majority of the teams were from the United States, with one each from Canada, Spain and Puerto Rico. The nineteen university teams built small solar houses, of about 60 to 70 square metres in size, on the National Mall in front of the Capital Building in October 2005. The objective was to design a completely solar powered house that is self-sustaining for an entire week. Specified requirements included minimum lighting levels, acceptable interior temperature range, water usage and hot water temperature levels. The houses must be able to accommodate normal domestic tasks such as laundry, cooking and showering. CMHC's involvement included financial and implementation support to the process, technical advice and guidance, and creating and transferring knowledge on renewable energy based sustainable housing. This project's overall outcomes are: 1) to illustrate how solar energy can improve Canadian's quality of life: solar energy is clean; it significantly reduces pollutant emissions; and solar energy is renewable thereby increasing a nation's energy security. 2) To teach the solar decathletes and the public about how energy is used in their daily lives and to illustrate the energy intensity of various daily activities. 3) To demonstrate that market-ready technologies exist that can meet the energy requirements of our daily activities by tapping into the sun's power. 4) To meet these needs while providing an attractive structure in which to live, work and play. A related long-term objective of this project is to build enhanced alliances between project partners leading to the capacity development for a future Canadian Solar Decathlon competition. A final summary report will be available late in 2007.

***CMHC Project Officer** : Douglas Rowland*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32060200
STATUS : Ongoing

ANALYSIS OF RENEWABLE ENERGY POTENTIALS IN THE RESIDENTIAL SECTOR THROUGH HIGH RESOLUTION BUILDING ENERGY SIMULATION

Due to recent advancements in renewable energy technologies such as photovoltaic (PV) and micro-wind turbine systems, the potential for large-scale deployment of such energy sources for a more sustainable society has never been greater. This research will provide a detailed techno-economic assessment of renewable energy potentials in the residential sector through high-resolution building energy simulation using large numbers of representative housing data. The overall objective of the proposed research is to create a tool for potential techno-economic assessment of such technologies to reduce overall energy consumption and its associated green house gas (GHG) emissions in the housing sector. The project entails modelling novel, environmentally-friendly, integrated building energy systems for building applications, and conducting simulation of building integrated renewable energy potential for the Canadian residential sector using advanced building energy simulation software.

***CMHC Project Officer** : Woytek Kujawski*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370205
STATUS : Ongoing

DEVELOPING A GREEN RATING SYSTEM FOR RESIDENTIAL BUILDINGS

This project was comprised of three separate but related parts. The first part of the project was carried out to support the research and facilitation of a multi-stakeholder process for the development and implementation of an Action Plan to address the issues surrounding the use and application of LEED for Multi-Unit Residential Buildings (MURB's). The goal of this part of the project was to develop recommendations on i) what issues arising from the use of Green Rating

Systems need to be addressed; and ii) how to build support in the private and public sector on the application of Green Rating Systems for MURB projects. Undertaken by the Canada Green Building Council (CaGBC), the funding partners included CMHC, the Greater Vancouver Regional District (GVRD), the CaGBC and NRCan. The results of this part of the project contributed to the development of guidelines for the application of LEED in multi-unit residential buildings. The guide is available through the CaGBC.

The second part of the project involved providing support for the training of the building trades of members of Built Green Alberta through the development of a programme by Southern Alberta Institute of Technology (SAIT) for the Calgary Region Home Builders Association (CRHBA). The goal was to develop a programme for training the construction trades in green building techniques, specifically for the builders taking part in the Built Green Alberta Programme, a programme developed by the Calgary Region Home Builders Association to assist in the delivery of 'green' buildings to the marketplace.

In the third part of the project, CMHC carried out research to evaluate two existing green rating systems for the low-rise residential sector, Built Green Alberta and LEED for Homes, made recommendations for making improvements to the existing rating systems, and evaluated and made recommendations for the development of a comprehensive green rating system for the residential market. The third part of the project was completed in August 2006 and a report will be available by December 2007.

CMHC Project Officer : *William Semple* ***CIDN*** : 32100200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

DEVELOPMENT AND DEMONSTRATION OF A LIFE CYCLE COSTING TOOL APPLIED TO GREEN TECHNOLOGIES

For the residential building industry, the cost of constructing green buildings or incorporating green technologies, combined with the difficulty of marketing these higher performance homes and technologies, remains an issue that has effectively slowed the use of green building technologies in the residential market segment. The diffusion barrier arises on both sides of the equation – with the prospective buyer, and the developer/builder.

In order to aid the adoption of greener technologies, Canada Mortgage and Housing Corporation retained the Athena Institute in association with Morrison Hershfield Limited to develop a simple Excel© spreadsheet-based life cycle costing (LCC) calculator tool (and users' guide) to help builders and developers estimate the viability of green technologies applicable to single family homes and mid-size multi-unit residential buildings (MURBS). To further demonstrate the tool, the project team identified a set of 14 green technologies and prepared illustrative life cycle cost assessments of these technologies using the LCC calculator.

The overall intent of the project is to help builders and developers conduct life cycle costing evaluations of various green technologies, so they better understand and can better communicate these results to prospective clients. LCC is an economic method for evaluating project investment alternatives over a selected period of time. It is particularly suited to determining whether the higher initial cost of an investment is justified by reductions in future costs (e.g., operating, maintenance, repair or replacement costs). It can also be used to compare alternative investments with different initial and future costs.

The accompanying LCC users' guide documents each field to be completed by the user, provides sources for various data elements, and describes each of the results in simple terms to make LCC more accessible to the building community. The users' guide also contains an example LCC calculation, complete with the various inputs and results indicated by a screen capture of the tool.

Prepared by Athena Sustainable Materials Institute and Morrison Hershfield Ltd. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2006. 74 pages (680 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/LifeCycle_WEB.pdf

DEVELOPMENT OF A SUSTAINABLE PERFORMANCE ASSESSMENT TOOL FOR HOUSING

An External Research project was initiated to develop a sustainability performance assessment tool for housing in Canada. The project provides a framework that permits a broad-scope sustainability assessment of multi-family housing in Canada. The framework is based on SBTool, an internationally accepted assessment toolbox that allows specific ratings to be produced for a variety of regions and end uses, by adjusting scope, weights and (local) benchmarks. The system covers a full range of environmental, social and economic variables, provides internal calculation tools for the estimation of Green House Gases, based on regional emission values, and also an approximate embodied energy calculator. The version provided to CMHC has been calibrated for multi unit residential buildings, but other alternatives, such as mixed use buildings (for example residential and retail) can also be assessed. The tool with its Guide (Overview) is available for download at iiSBE (International Initiative for a Sustainable Built Environment) Website: http://iisbe.org/iisbe/sbc2k8/sbc2k8-download_f.htm A Research Highlight that describes the tool will be available by March 2008.

CMHC Project Officer *: Woytek Kujawski* — ***CIDN*** : 28920211

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

EVALUATION OF THE IMPACT OF ENERGY EFFICIENCY AND SUSTAINABLE DEVELOPMENT MEASURES ON AFFORDABLE HOUSING

This External Research Program study will analyze the impact of including energy efficiency and sustainable development (treatment of grey water, "green materials") measures on the operation of community housing buildings. The analysis will deal with actual energy costs vs. projected costs, the costs of maintenance service and the effects on maintenance practices.

CMHC Project Officer *: Woytek Kujawski* — ***CIDN*** : 36260210

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

INSTITUTIONAL SUPPORT - CANADIAN SOLAR INDUSTRY ASSOCIATION (CANSIA) 2006

Solar energy applications, from passive solar design to active applications such as photovoltaics and solar thermal technologies, are an essential component of CMHC's Healthy Housing and sustainable community planning agenda, and are key to a successful EQuilibrium Sustainable Housing (formerly known as Net Zero Energy Healthy Housing) initiative in Canada. However, the Canadian solar energy industry is relatively small and has not yet established the full capacity to help coordinate solar energy research, and to provide information on solar energy to consumers, industry and governments. In recognition of this, CMHC will provide funding to CANSIA to support the organization with its efforts to develop and promote renewable energy technologies, build integrated solar design and systems, and represent Canada's renewable energy industry.

CMHC Project Officer *: Douglas Rowland* — ***CIDN*** : 36010200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

INTEGRATED SUSTAINABLE BUILDING DESIGN - SUPPORT OF THE 2007 'SOLAR DECATHLON'

In this project, CMHC will support the Canadian team entry led by ETS to participate in the 2007 Solar Decathlon in Washington D.C. The objective of the competition is to design and build houses of about 60 to 70 square metres in size which are completely solar powered and self-sustaining for an entire week. Specified performance requirements will be measured in ten categories, and include energy performance, lighting levels, acceptable interior temperature range, water usage and hot water temperature levels. CMHC's involvement will include financial and implementation support to the process, technical advice and guidance, and creating and transferring knowledge on high performance, renewable energy based sustainable housing.

CMHC Project Officer *: Douglas Rowland* — ***CIDN*** : 36180200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MAXIMIZING ENERGY EFFICIENCY IN A MULTI-UNIT RESIDENTIAL BUILDING: AN APPLICATION OF DESIGN AND MONITORING STRATEGIES TOWARDS NET ZERO

This project will support the design and development of a sustainable seniors housing project in the South East False Creek area of the City of Vancouver. The project will embody as many innovative design and construction features to ensure that the building achieves a high level of performance in terms of energy and water efficiency, indoor environment, environmental impact and resource consumption. The design and construction processes will be documented, quality assurance and performance monitoring plans will be devised, deployed and documented, occupant, manager and owner surveys conducted and a final report prepared documenting the outcomes of the project. Construction is expected to commence in 2008 with the final report delivered in 2011. Regular progress reports will be made available as significant milestones are achieved.

CMHC Project Officer *: Lance Jakubec* — ***CIDN*** : 36090200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MEASURING SOLAR PERFORMANCE

The purpose of this External Research Program project is to build and operate a measurement and monitoring program to evaluate the performance of a conventionally built house which uses a range of active and passive solar systems. It is fully off-grid, self sufficient in energy and includes a number of technologies. The intent is to install and operate a number of small data collection systems over a three year period. These will give a comprehensive view of the actual performance of the house in regular use, including its operating environment.

CMHC Project Officer *: Woytek Kujawski* — ***CIDN*** : 28920212

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ***NEW***

NSERC CANADIAN UNIVERSITY NETWORK ON "SOLAR ENERGY UTILIZATION IN BUILDINGS"

CMHC is supporting a new Natural Sciences and Engineering Research Council of Canada (NSERC) funded University Network on "Solar Energy Utilization in Buildings", to achieve the objective of enhancing the capacity of the residential industry to develop solar buildings with substantially reduced purchased energy needs. The overall vision of the Network over its five year period will be to advance the adoption of new knowledge, tools, practices and technologies for cost effective construction of solar zero-net-energy buildings in Canada. The main objectives of the Network over its five-year research program are the following:

1. To develop effective techniques for integration of solar collection, storage and utilization systems in the building envelope.
2. To develop and improve solar energy utilization technologies so as to reduce cost and raise overall efficiency.
3. To develop and demonstrate affordable, reliable, building integrated, distributed power generation systems based on solar energy for residential and commercial buildings.
4. To develop simulation design tools and methodology that may be effectively utilized throughout the design process.
5. To transfer these outputs to the end users.
6. To contribute to the development of government policies and programs aimed at fostering the adoption of solar technologies in buildings.

The Solar Buildings Network began its first year of a five year work plan in 2006.

CMHC Project Officer : Douglas Rowland
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 34020200
STATUS : Ongoing

REGINA AFFORDABLE SOLAR HOUSING

Current economic and demographic conditions have led to a well recognized need for the creation of a diverse array of affordable housing solutions across Canada. At the same time, it is critical that housing built today will provide a healthy environment that is sustainable in terms of energy and resource use and impacts on land, air and water. This project addresses these combined challenges by developing affordable solar urban infill housing design solutions that revitalize urban environments, dramatically reduce impacts to natural systems, and create affordable and desirable communities to live in. The project output will be a descriptive and visual presentation of affordable solar housing designs for specific urban sites in Regina, developed by graduate students in the McGill University School of Architecture program, and targeted to the designer, builder and developer audiences. The project is a partnership between CMHC, the City of Regina, McGill School of Architecture Affordable Housing Program, and the Saskatchewan Housing Corporation. Results available in fall 2007 will include general information on the innovative design studio approach, concept designs and examples of affordable solar housing designs for specific sites in Regina.

CMHC Project Officer *: Douglas Rowland*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28020200
STATUS : Ongoing

REGIONAL PILOT DEMONSTRATION OF NET ZERO ENERGY HEALTHY HOUSING

This project involves the development of a national net zero energy healthy housing demonstration and implementation initiative through an industry partnership to advance new Canadian housing towards a net zero energy consumption goal. The initial project concept involves the design, construction, demonstration and monitoring of 12 net zero energy healthy houses in a project called the EQuilibrium Sustainable Housing Initiative. The designs for the 12 projects were completed in early 2007. Construction of 6 projects has been initiated with the rest expected to follow in the next few months. Demonstrations will permit the design-construction teams to show their achievements to the residential building industry and consumers. Upon completion of the demonstrations, the houses will be sold and CMHC will monitor the performance of the houses for one year post occupancy. Final project reports are expected by June 2011. Based on the outcome of this demonstration initiative, CMHC will explore with its partners and stakeholders opportunities to expand this initiative more broadly across Canada. The EQuilibrium Sustainable Housing Initiative is based on CMHC's five principles for Healthy Housing. It combines sustainable community planning, passive solar, energy efficient design, construction and appliances, with commercially available grid tied renewable energy systems to achieve net zero energy consumption and reduced GHG emissions on an annual basis. The intended results and impacts of the EQuilibrium initiative are to develop strategic alliances between industry and government to reduce the energy intensity of our housing sector, mitigate household energy cost increases in the medium term, foster a growing renewable energy and sustainable housing industry in Canada, increase consumer awareness and demand for sustainable housing, and support Canada's goal of reducing pollutant and green house gas (GHG) emissions. The development of the EQuilibrium initiative in Canada will also help to ensure Canada's inclusion in competitive international housing markets and our next generation of value added exports.

CMHC Project Officer : *Douglas Rowland* ***CIDN*** : 35490200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

SOUTHEAST FALSE CREEK INTEGRATED DESIGN PROCESS WORKSHOP: FINAL REPORT

The development of Vancouver's Southeast False Creek (SEFC) is a project of substantial scope that includes construction of the 2010 Olympic Village. With a tight schedule and high profile for the Olympic event, the City of Vancouver, in partnership with Canada Mortgage and Housing Corporation, hired consultants to organize and facilitate a kick-off Integrated Design Process (IDP) workshop to develop synergies and build consensus within the development team around the project vision and goals. The pre-design activity also allowed key concepts to be incorporated into all aspects of the design, construction and commissioning process. Participants generated a schedule of defined priorities and delegated tasks to move the project forward.

Prepared by Sustainable Building Centre. Sponsors: City of Vancouver, Canada Mortgage and Housing Corporation, Natural Resources Canada, BC Hydro PowerSmart. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2006. 2 volumes

Note: No. 07-107 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order no. 65350)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : On a loan basis from the Canadian Housing Information Centre

SOUTHFIELD SOLAR HOME MONITORING AND EVALUATION CASE STUDY

This project is a partnership between Natural Resources Canada and Canada Mortgage and Housing Corporation, with the participation of Thomasfield Homes Ltd., and Nexus Solar Corporation. The project will describe the design, and do modelling and monitoring of the Southfield solar EnviroHome in Guelph, Ontario, to indicate the measured energy delivery of each of the Southfield's renewable energy system upgrades as compared to the conventional systems in the Argyle house (next door), and to a hypothetical Southfield house built to Ontario Building Code standards. The houses are of similar size with similar market features except that the Southfield house incorporates passive solar design, a solar domestic hot water system, and photovoltaic panels, as well as some other advanced energy systems including a demand water heater, and is built to the EnviroHome standard. The project results will provide an understanding of real field results through on-site research/monitoring, and reveal the successes and remaining challenges of incorporating commercially available renewable energy systems into a standard housing development. The study will also create a reporting format for identifying and comparing key features of energy-efficient houses. A final report and CMHC Case Study on the project will be available late in 2007.

CMHC Project Officer : *Douglas Rowland* ***CIDN*** : 29790200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SUPPORT FOR THE ASTHMA EDUCATION CENTER AT THE OTTAWA HOSPITAL

A demonstration house built by CMHC and previously known as the Research House for the Environmentally Hypersensitive was acquired by the Ottawa Hospital. Launched in 2006 as The Breathing Space, it will function as an education center for people with asthma, chronic obstructive pulmonary disease (COPD) and other respiratory diseases. CMHC's contribution to the Respirology Division of the Ottawa Hospital will measure over the next two years the level of knowledge of patients about clean housing prior to visiting the house and the adoption and implementation of information as a result of the visit.

CMHC Project Officer : *Virginia R Salares* ***CIDN*** : 33000200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

TAP THE SUN: REVISION AND UPDATE

This project will revise and update the CMHC "Tap the Sun" publication and accompanying CD-ROM. "Tap the Sun" is an introduction to passive solar design for housing, and presents various passive solar techniques and Canadian home designs. The revised "Tap the Sun" product will include important data updates, a wider selection of case study projects, more detailed key resources, and improvements to the integrated tools such as the Comfort Design Checker and the window products design database. As well, the accompanying CD-ROM will include other related software tools such as the RETScreen Solar Heating Module from Natural Resources Canada. The revised product will be available in early 2008.

CMHC Project Officer : *Woytek Kujawski* ***CIDN*** : 25450200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

WORLD HOUSE PROJECT

The World House Project involves a multi-disciplinary team including professionals and students, in the research, design and building of a universal, sustainable house and housing system. The goals of the project are to design and prototype a housing system that achieves a balance between extremes of urban sprawl and urban slums; to encourage and facilitate the building of sustainable, universal, and healthy human dwellings and communities; to share the results; and to train students.

CMHC Project Officer : *Mark Salerno*
Division : Policy and Research Division
CIDN : 34850200
STATUS : Ongoing
AVAILABILITY : Product is not yet available

See also: **Socio-economic research on Sustainable Development & Healthy Housing, p.** 112 - 115
SUSTAINABLE NORTHERN COMMUNITY DEVELOPMENT CHARRETTE IN YELLOWKNIFE, N.T., p. 51

WATER CONSERVATION, REUSE & MANAGEMENT

ACTION PLAN FOR SUSTAINABLE PRACTICES: IMPLEMENTATION STRATEGIES FOR THE RESIDENTIAL AND BUSINESS SECTORS IN THE GREATER TORONTO AREA

Watersheds in metropolitan areas across Canada are suffering degradation as a result of urbanization. Loss of natural vegetative cover, an increase in the area of paved and other impervious surfaces, and storm sewer systems in older urban areas that route stormwater to streams and rivers, greatly increase the stormwater loading in watersheds and disrupt the natural water balance.

The Greater Toronto Area (GTA) is a case in point. Education and awareness campaigns to encourage the adoption of "lot level" and "at source" practices for stormwater management have yet to achieve widespread success. Uptake of sustainable practices by residents and business owners/managers is seen as a key part of implementing GTA-wide watershed management plans and creating sustainable watershed communities.

The goal of the study was to determine the marketing opportunities and barriers to improving uptake of lot level stormwater management and other sustainable practices amongst residents of single-family dwellings and business owners/managers of commercial/light industrial facilities in the GTA, and to develop strategies and mechanisms to drive uptake of such practices.

Prepared by Freeman Associates. Prepared for: Toronto and Region Conservation Authority, Canada Mortgage and Housing Corporation, Environment Canada, City of Toronto, Regional Municipality of York, Region of Peel, the Regional Municipality of Durham. CMHC Project Officer: Sandra Baynes. Ottawa: Canada Mortgage and Housing Corporation, 2006. 229 pages (3470 KB)

Note: No. 07-110 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site (Order number 65378)

STATUS : Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/SOCIAL(W).pdf

ALTERNATIVE STORMWATER MANAGEMENT - WATERSHED RESTORATION

This work will see the development of a number of integrated stormwater planning, design and management tools for builders, developers, and municipal staff. These tools will assist in smart urban development by providing a means for assessing watershed health and prioritizing areas for restoration thereby allowing stakeholders to make informed choices on urban development and stormwater management. The ecologically engineered storm water management tools presented here will improve stormwater drainage systems, improve water quality and reduce the negative impact of stormwater infrastructure on the environment by utilizing an ecological system that has a greater resilience to drought and flooding in the face of climatic changes. Project completion and report submission are scheduled for spring 2008.

CMHC Project Officer *: Catherine Soroczan*
CIDN : 33880200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DO PRESSURIZED AT-GRADE ON-SITE SEWAGE SYSTEMS PROVIDE QUALITY TREATMENT COMPATIBLE WITH THE LANDSCAPE?

At-grade wastewater treatment systems are currently approved for use in Alberta. However, recent research indicates that full sewage treatment does not always occur. This External Research study will examine 2-3 installed systems and assess the performance efficiency of an altered distribution pattern. Parameters to be measured include moisture content, bacterial counts, and nutrient content changes in the soil layer to which effluent has been applied. The final report is due in December 2009.

CMHC Project Officer *: Catherine Soroczan*
CIDN : 28920209
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

ENERGY INTENSITY OF CANADIAN WATER SYSTEMS

CMHC in partnership with NRCan, Greater Vancouver Regional District, and B.C. Hydro, is leading a multi-stakeholder study to determine the energy intensity of water systems in Canadian urban centres. The objective of the research is to quantify the amount of energy used within water and wastewater systems and the potential energy impact of water conservation. Energy intensity profiles will include extraction and conveyance of water imported from outside a local watershed; extraction of local surface and groundwater sources; treatment and distribution of potable supplies; and, wastewater collection, treatment, and discharge. Total energy inputs are region specific as they are dictated by factors such as: water quality and availability, climate patterns, settlement patterns, level of treatment, treatment processes used, topography, distribution pumping and pressurization requirements, etc. In order to allow for comparison between study areas, an attempt will be made to develop a meaningful method to normalize water related energy use. Potential performance indices include energy use per capita, per hectare served, per fixture served, etc. This work will provide an opportunity to evaluate the methodology used in the project, the availability of the required inputs, the usefulness of the output derived and the potential applicability to other jurisdictions. Preliminary work undertaken in Vancouver will be complemented by further work in another municipality (to be determined) in order to provide a comparison of system energy consumption. The project is expected to be completed by the fall of 2008.

CMHC Project Officer *: Catherine Soroczan*
CIDN : 32290200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

EVALUATION OF ENZYMES OR BACTERIAL ADDITIVES FOR THE REHABILITATION OF FAILED LEACHING BED SYSTEMS

The proposed research aims to determine the viability of using biological septic system additives (enzymes and/or bacterial cultures) to rehabilitate leaching beds experiencing trench failure. In addition, the data collected during the execution of the proposed study will also assist in developing an application methodology for homeowners, if appropriate. Project completion and final report submission is scheduled for March 2008.

CMHC Project Officer : *Catherine Soroczan*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 34380207
STATUS : Ongoing

EVALUATION OF EXPERIMENTAL ONSITE WASTEWATER SYSTEMS IN HEAVY CLAY SOILS AND COLD CLIMATES

This project will assess the performance of shallow/at-grade experimental onsite wastewater treatment systems in heavy clays and in cold climates. Parameters to be assessed will include: biofilm characteristics and treatment performance textile filters, hydraulic performance of soil systems, and temperature impacts. A final report is due December 2008.

CMHC Project Officer : *Catherine Soroczan*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 28370215
STATUS : Ongoing

EVALUATION OF WATER CONSERVATION PRACTICES

This research will provide municipalities with guidance in creating a cost effective water efficiency plan (WEP). The use of a standardized WEP will allow for practical and useful comparisons between water efficiency programs implemented across Canada. A template WEP will be developed to incorporate the variety of necessary parameters to be considered such as water source, population size and growth, regional socio-economic, climatic and geographic conditions, infrastructure status, target changes in water demands and wastewater flows, projected capital works and related costs, and cost/benefit. The WEP template will include a software database for creating a water efficiency plan plus a report documenting the key components of water efficient planning. The final report is anticipated to be published by December 2008.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30550200
STATUS : Ongoing

IMPACT OF WATER SOFTENERS ON SEPTIC TANKS: FIELD EVALUATION STUDY: FINAL REPORT

A field study of septic tank performance was conducted in order to determine whether water softener backwash addition to the septic tank had a significant effect upon tank performance. The sample group consisted of septic tanks receiving water softener backwash (n=27) and tanks not receiving water softener backwash (n=48). This study does not address impacts upon the performance of leaching fields.

Significant differences ($P<0.05$) in the sodium and chloride concentrations in tank sludges were found between the two groups with mean chloride concentrations increasing from 146 to 1515 mg/L and mean sodium concentrations increasing from 239 to 548 mg/L in tanks receiving water softener backwash. No significant differences ($P>0.05$) were found for indicators of tank performance including: septic tank effluent COD, CBOD5, TSS, and E.coli, sludge VSS and the sludge and scum accumulation rate. The results from this study indicate that water softener backwash discharged to septic tanks has no significant effect upon the biological or physical functioning of the septic tank; however, elevated chloride concentrations from water softener backwash may accelerate the corrosion of reinforced concrete tanks.

Submitted by Ontario Rural Wastewater Centre, Collège d'Alfred – University of Guelph. Authors: Chris Kinsley, Anna Crolla, Doug Joy. Ottawa: Canada Mortgage and Housing Corporation, 2006. 36 pages (2078 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Water%20Softener(W).pdf

INNOVATIVE RESIDENTIAL STORMWATER MANAGEMENT FOR SUSTAINABLE HOUSING AND COMMUNITIES

CMHC is supporting the development of strategies, policies, case studies and tools to support innovative residential stormwater management in Canada. This multi-party partnership includes the Canadian Water Network, Environment Canada, and various academic institutions and municipalities across Canada. Information developed by this project will be available through CMHC research reports and studies. Three design charrettes and a national conference to be held in 2008 will provide a venue for stakeholders to share information, and collaborate with other stakeholders across the country.

CMHC Project Officer *: Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 36420200
STATUS : Ongoing
NEW

RAINWATER HARVESTING - DEMONSTRATIONS

CMHC is supporting innovative projects with the Cities of Toronto and Guelph to advance rainwater harvesting technologies and strategies in the Canadian residential sector. A rainwater harvesting system for toilets and irrigation will be incorporated and monitored in a high-rise multi-unit residential building in downtown Toronto. A multi-goal project with the University of Guelph will serve to pilot rainwater harvesting applications for indoor and outdoor residential use while addressing technical and regulatory issues related to design, certification, approvals and performance. Information from Canadian and international examples regarding code issues, plumbing issues, technology design and performance issues will be adapted. The Cities of Toronto and Guelph will support the projects by working to remove any municipal obstacles that may preclude this work. Results from this work will be used to promote and increase awareness regarding the feasibility of rainwater harvesting for onsite reuse particularly for large scale residential developments. The project will be completed by November 2008.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 33190200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SLOPING SAND FILTERS FOR ON-SITE WASTEWATER TREATMENT

The overall objective of this External Research Project Grant is to develop and test design guidelines for Sloping Sand Filter (SSF) systems which maximize treatment performance while minimizing construction costs. The hydraulic characteristics and treatment performance of SSFs operated at different loading rates will be assessed within this study. These field studies will supply the data needed to calibrate and test a SSF hydraulic model. The model, once tested, will be used to develop and refine design guidelines for SSF systems. Project completion and submission of the final report are scheduled for August 2008.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 34380205
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SMALL COMMUNITY WASTEWATER TREATMENT OPTIONS

Wastewater servicing is an issue of increasing importance to society, in particular small communities across Canada. Typically communities with wastewater problems are given two options, on-site wastewater treatment or centralized sewer systems. The Ottawa Septic System Office believes that small communities do not have access to enough unbiased information when making servicing decisions. Public health and water quality should be of the greatest concern; instead pressures from outside interests, and personal agendas often interfere with the decision making process. It is proposed that an information package be made available to rural municipalities. This will help ensure a balanced and well educated approach to wastewater servicing problems.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 36260204
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

SUPPORT FOR NATIONAL ONSITE WASTEWATER RESEARCH PROGRAM

CMHC in conjunction with the Canadian Water and Wastewater Associations and the provincial onsite associations of Ontario, Alberta, and B.C. will work with national stakeholders across the country to address research and policy gaps in the area of decentralized wastewater management. The network will identify and prioritize all research and policy issues, and leverage funding to address these issues and communicate the results across the country. As a starting point, CMHC will support targeted research for the development of onsite wastewater technology verification and installation standards. To date CMHC has supported the Bureau du normalisation du Québec in the development of a nation standard for onsite wastewater technology verification. Three committee meetings have taken place and a draft national standard for public review is anticipated by spring 2008.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 35720200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SUPPORT FOR THE CREATION OF A NATIONAL WATER REUSE PROGRAM

CMHC will work with stakeholders from various government levels, associations, private industry and research centres to establish a Canadian national residential water reuse research and development program of work. This program will address gaps including: policy needs, risk analysis, design standards, pricing strategies, technology performance criteria, enhanced pilot testing and technology demonstration, national guidelines and regulations and innovative technology support for export to developed markets. The first project under this program has been the development of a draft national water reuse standard for toilet application. The standard is anticipated to be finalized by spring 2008.

CMHC Project Officer : *Catherine Soroczan*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 35730200
STATUS : Ongoing

See also: **SEVEN GENERATIONS. WATER CONSERVATION AND SAFETY, p. 73**
MODELLING AND ASSESSING LOWER RAINWATER RUN-OFF IN STRATFORD, ON, p. 105
STORMWATER MANAGEMENT CASE STUDIES, p. 105

SOCIO ECONOMIC RESEARCH

ABORIGINAL HOUSEHOLD, HOUSING AND COMMUNITY CONDITIONS BASED ON THE ABORIGINAL PEOPLE'S SURVEY (APS)

The consultant hired for this project has completed consultations with stakeholders both internal and external to CMHC, including all National Aboriginal Organizations (NAOs). He is now using the consultation results to identify and develop an analysis plan and an assessment of data requirements in preparation for the analysis of custom data linking Statistics Canada's post-censal Aboriginal People's Survey (APS) to CMHC's custom 2001 Census-based housing conditions indicators. The development of data specifications and the research issues to be analysed is being done through consultations between the consultant, CMHC staff, DIAND, and the NAOs. Based on these specifications, Statistics Canada will produce the custom data, which will be analysed and applied to the research issues (using the analysis plan developed through the consultation process). The 2001 APS is the single most comprehensive source of information on household, housing and community conditions faced by Canada's Aboriginal Peoples. The APS has been linked to CMHC's 2001 Census-based core housing needs indicators and the combined data are beginning to be acquired for analysis to profile the housing and community challenges facing each of Canada's Aboriginal peoples. As the research is completed, research findings will be published via research reports/highlights and at the end it is planned that an electronic data base specific to Aboriginal housing conditions will be developed and released.

CMHC Project Officer : *Ian Melzer* ***CIDN*** : 35760200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

ABORIGINAL HOUSING ASSESSMENT : COMMUNITY DESIGN NEEDS & PREFERENCES AND APPLICATION OF LOCAL MATERIALS

This research report documents a study of the use of local materials in four Aboriginal communities, as well as the housing design needs and preferences as expressed by fourteen communities selected from the major Aboriginal cultural regions of Canada. Benefits and impediments are documented.

Prepared by Lisa Hardess, Rodney C. McDonald, and Darren Thomas, Centre for Indigenous Environmental Resources. CMHC Project Officer: Phil Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2004. 2 volumes (volume 1: 2595 KB; volume 2: 1425 KB)

Note: No. 05-001 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 63834)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Aboriginal%20Part%201%20(W).pdf (Volume 1)
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Aboriginal%20Part%202%20(W).pdf (Volume 2)

CAPITAL REPLACEMENT PLANNING MANUAL & PRESENTATION MATERIAL - ON RESERVE

This project will support On-Reserve Housing. The overall outcomes will be: the Capital Replacement Planning manual and training material will provide guidance and training to On-Reserve Housing Providers and help them to maintain the current housing stock and ensure that the replacement of capital items are planned for and completed in a timely manner, and that Replacement Reserve Funds are adequately funded to meet these needs. The project will result in the production of a comprehensive manual on Capital Replacement Planning for First Nations. Training material based on this manual will also be produced.

CMHC Project Officer : *Fatima M Barros* CIDN : 29481500

Division : Assisted Housing Division STATUS : Ongoing

AVAILABILITY : Product is not yet available

CASE STUDIES OF THE CRITICAL PRECONDITIONS FOR ACHIEVING MARKET-BASED APPROACHES TO HOUSING IN FIRST NATION COMMUNITIES

This project consists of at least 8 case studies of First Nation communities that have an established housing system with market characteristics. The studies will identify for each community the necessary and sufficient condition that enabled the market-like system to be implemented or to evolve. The findings from each community will be compared with each other to highlight commonalities and unique solutions and will also be compared with documentation of homeownership initiatives on tribal trust lands in the US.

CMHC Project Officer *: John Black*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 36800200
STATUS : Ongoing
NEW

ESTABLISHING EFFECTIVE HOUSING MARKETS IN FIRST NATION COMMUNITIES

Based on recommendations of Regional staff and on consultations and/or focus groups with First Nations, and using the information (best practice/critical success factors) obtained in the Part IX Home Ownership Implementation Strategy, the project will identify a number of First Nation communities that are desirous of and willing to introduce a home ownership product in their community. It will investigate whether the availability of a homeownership option in the community will contribute to resolving the housing problems in the community. This could include First Nations wishing to use the Loan Insurance Pilot product. The project consultant will recommend a number of First Nations to be part of this project, and will layout a proposed implementation plan based on the individual First Nations chosen. They will work with the community to identify any shortfalls in understanding, knowledge, skill, policy and process, and will provide tools, direction, training, capacity development, guidance, and solutions to the identified problems. The project will document the process followed, highlighting the pitfalls, obstacles to success and opportunities for improvement for First Nations wishing to implement their own program. It will include establishment of a tool kit of resources needed to introduce and implement home ownership programs including such things as: i) introducing the home ownership concept to the community ii) determining demand for home ownership iii) establishing housing management systems. The results of the project will be highlighted and communicated to client groups via a Research Highlight; a highlight which First Nation communities can refer to in the development of their own program, specifically the pursuit of a functioning housing market via homeownership on reserves.

CMHC Project Officer *: Kathy Hague*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 32831500
STATUS : Ongoing

ESTABLISHMENT OF ON-RESERVE HOUSING AUTHORITIES

The research project will investigate and document the critical success factors associated with housing authorities or similar structures. This will aid First Nation communities in their quest for more efficient and effective housing system management. The report will identify issues, challenges and success factors. A number of potential housing management models will be reviewed to guide First Nations in the establishment of housing institutions, including housing authorities.

CMHC Project Officer *: Line Gullison*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 31841500
STATUS : Ongoing

FEASIBILITY OF COMMUNITY RISK MANAGEMENT AS A SUBJECT FOR CAPACITY BUILDING IN ABORIGINAL COMMUNITIES

The objective of this project is to ascertain what are the components of risk management that are relevant in an Aboriginal community context, and to assess these against pragmatic criteria (as to whether the components can be taught in a capacity development environment and carried out by an Aboriginal community). The following tasks are envisaged: to review text and existing course materials; to determine what materials are relevant; to carry out interviews with risk management professionals and institutes, practitioners, CMHC, Indian and Northern Affairs Canada and other capacity development personnel & Aboriginal groups; to do analysis; and to make recommendations for course content and training methods.

CMHC Project Officer : *Ed Nera*	***CIDN*** : 24280200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

FIRST NATION HOME OWNERSHIP IMPLEMENTATION STRATEGY

This project will investigate and document the issues, impediments and opportunities of introducing home ownership options into First Nation communities. It will review existing models/mechanisms currently being employed in First Nations communities under the banner of 'home ownership', evaluate the effectiveness of the models and recommend 'best practices' in a final report. The report will identify the benefits of a home ownership component in a community based housing strategy, and recommend strategies to implement/integrate home ownership models into a community.

CMHC Project Officer : *Kathy Hague*	***CIDN*** : 31701500
Division : Assisted Housing Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

FORMATION OF FIRST NATIONS NATIONAL HOUSING MANAGERS ORGANIZATION

This third phase of the project will continue to assist First Nation Housing Managers in formally organizing and launching their association by employing an Aboriginal consultant to meet with the newly elected board of the Association to draft and carry out a work plan for 2007. This could include the official launching of the association, a formalized website redesign and expansion, database development, construction, and populating through surveys of housing managers, development of membership package and membership campaign. The objective is to improve housing management on-reserve via capacity development through the formation of a First Nations National Housing Managers Association.

CMHC Project Officer : *Randy Risk*	***CIDN*** : 35351500
Division : Assisted Housing Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

GIS: A USEFUL TOOL FOR FIRST NATIONS HOUSING MANAGEMENT, PLANNING, MAINTENANCE AND SAFETY

The Cree First Nation of Mistissini, one of the James Bay Cree (JBC) First Nations in northern Quebec, was an early adopter of a Geographic Information System (GIS). A GIS is a computer-based tool for information collection, modification, analysis and output in the form of maps and reports. While the community of Mistissini use their GIS for community housing and public safety needs, most other First Nations with a GIS have limited its use to forestry and natural resource management. This study describes the implementation and ongoing use of GIS in Mistissini. A Geographic Information System helps analyze problems through the visualization and quantification of spatial relationships. Many housing and public safety issues respond particularly well to visual analysis through use of maps.

While the focus of the study is on the use of GIS for housing and related purposes, there are also important lessons to be learned for those communities that do not feel the need or do not yet have the resources to consider implementing a GIS. These lessons include best practices such as: backing up data, organizing, storing, converting and linking housing data. The case study discusses and compares a number of options for organizing information (both for GIS and non-GIS applications such as spreadsheet, database, word processing, graphics and computer-aided drafting programs that are commonly available) that have met many of the information needs of the other JBC communities.

This case study will be of interest to First Nations Councils and staff who oversee or manage housing resources and have responsibility for public safety as well as agencies such as First Nations School Boards, Health Authorities and large First Nations commercial ventures that have housing and building resources.

Prepared by Jeff Sutton, Nusantara Geomatic Services. CMHC Project Officer: Phil Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2006. (External Research Program Report) 79 pages (2308 KB)

Note: No. 07-005 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65431)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHICGISw.pdf

GUIDE TO CITY HOUSING FOR ABORIGINAL PEOPLE

This product will provide Aboriginal people with practical information concerning how to obtain housing in urban centres. The publication will be a guide for those relocating from small rural and remote communities and also for those in urban centres who need further information concerning housing and homeownership.

CMHC Project Officer : *Ian Melzer*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 34130200

STATUS : Ongoing

PATTERNS AND TRENDS OF URBAN ABORIGINAL RESIDENTIAL SETTLEMENT

This project will investigate the housing patterns of urban Aboriginal people and the links between these and the socio-economic outcomes for these people, either positive or negative, associated with living in Aboriginal neighbourhoods. Housing settlement patterns in the major urban areas of Canada with substantial Aboriginal populations will be described statistically, using established indices for spatial distributions of population (evenness, clustering, concentration, centrality and isolation) at different levels of geographic aggregation. The statistics will be discussed in terms of the pros and cons of the indices and geographies for each urban centre. The statistics will then be input into an analysis with a selection of socio-economic census variables. These variables will be chosen for their potential relevance to social and economic outcomes that have been suggested in the research literature.

CMHC Project Officer : *Ian Melzer* ***CIDN*** : 25570200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PROJECTING ABORIGINAL HOUSING DEFICIENCIES

The proposal is in three parts. One is to use 2001 census data, supplemented by program administration data, to calculate the housing deficiency for the Aboriginal population. The deficiency is based on CMHC's established housing need measures, but measures both the incidence and depth of need, for on- and off-reserve. Through integration of census with program data on-reserve, the deficiency can be translated into a dollar value, giving an estimate of the cost of "correcting" the Aboriginal housing problem. In the other parts, the Aboriginal population is divided into on-reserve and off-reserve respectively and projected over 20 years, using an up-to-date model that incorporates shifts of identity and geography within the overall class of 'Aboriginal'. On reserve where the main issue is inadequate rate of housing supply, current trends in housing stock construction and losses and rates of repair and disrepair will be calculated and superimposed on the household projections to indicate gains or losses in the size of the housing deficiency. Off reserve where the main issue is low incomes, projection is limited to population and household estimates by the four Aboriginal groups, no attempt being made to project the size of the housing deficiency, which would involve forecasting economic and housing market conditions. Instead, off reserve, two separate research ideas will be pursued - calculating income elasticity of demand for Aboriginal homeownership, and investigating the relationship of residential mobility to resolution of housing needs. Projections of the Aboriginal population, households, and families have been completed. Overviews of these projections are being published by Indian and Northern Affairs Canada, who are jointly funding and partnering this initiative.

CMHC Project Officer : *Ian Melzer* ***CIDN*** : 29890200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SEVEN GENERATIONS. WATER CONSERVATION AND SAFETY. A HOUSING MANAGER'S GUIDE

This research will consist of three components: examining and documenting the types of water problems that are encountered in 10 First Nation communities and their impacts on housing; proposing solutions to alleviate these problems and impacts; and production of a user-friendly plain language guide to water management and safety for housing managers in First Nations communities.

CMHC Project Officer : *Ian Melzer* ***CIDN*** : 30230200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

SMALL FOOTPRINTS ON UNBROKEN LAND / HEALING BROKEN LAND

The project will contribute professional advice and services towards a new First Nation development project located on wild unbroken land in coastal BC and / or on previously used industrial or agricultural broken land. Starting with planning workshops and the development of a community plan, then moving towards establishing a renewable energy platform based on a business plan that establishes a continuous revenue stream, a sustainable development strategy and design solution will be produced for housing construction under Section 95 funding and other recently announced programs to produce 150± homes over 5 years. This will be combined with infrastructure funding from Indian and Northern Affairs Canada, Western Economic Diversification Canada, Natural Resources Canada and Human Resources and Social Development Canada. This project will produce a practical demonstration of sustainable planning, design and development models for rural and remote communities elsewhere in Canada. Fully planned and developed communities, complete with renewable energy systems, road, water, waste water and other essential infrastructure, will occur in several First Nation locations. Development models will be produced that encourage incorporation of sustainability principles and that are built upon economic development and capacity building. The ultimate outcome is 100-150 new homes built by community members in a community planned by the community through workshops and design charrettes.

CMHC Project Officer : *Allan Dobie*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 35290200
STATUS : Ongoing

SUPPORTING ABORIGINALLY MANAGED HOUSING OFF-RESERVE

This project is a comparative analysis of the government's approach in New Zealand, Australia and Canada in responding to the housing needs of their indigenous populations, and their urbanization.

CMHC Project Officer : *Ian Melzer*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30070200
STATUS : Ongoing

SUSTAINABLE HOUSING IN THE NORTH

The objective of this research is to produce a user-friendly plain language research report that provides a background of "northern" (North of 60) housing in Canada, identifies the types of challenges encountered in northern housing in Aboriginal (Inuit, First Nations, Métis) communities and provides best practice examples of sustainable housing (durable, affordable in construction through use of local materials when possible and in maintenance through provision of energy, water and waste water management at a manageable cost) and sustainable housing components that have proven to be successful in Canada, and in northern countries that have geographic, climatic and resource challenges similar to those in northern Canada and which may be used, or adapted for use, in Canada.

CMHC Project Officer : *Ian Melzer*
Division : Pollicy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32740200
STATUS : Ongoing

URBAN ABORIGINAL HOUSEHOLDS: A PROFILE OF DEMOGRAPHIC, HOUSING AND ECONOMIC CONDITIONS IN CANADA'S PRAIRIE AND TERRITORIES REGION

This study of the urban Aboriginal population of the Prairie and Territories Region (PTR) provides a housing and socio-economic profile of Aboriginal persons in 19 communities. Utilizing the most current Statistics Canada census and CMHC data, this study provides a portrait of economic factors and housing conditions among Aboriginal persons of the Prairie and Territories. As well, comparisons of some of these factors are made between Aboriginal and non-Aboriginal populations.

This study was undertaken to provide baseline information for agencies involved in Aboriginal or affordable housing issues. It is hoped that this study will be useful for community discussions on these same topics.

Prepared by Tom Kerwin. Ottawa: Canada Mortgage and Housing Corporation, 2006. 33 pages (1554 KB)

Note: No. 06-024 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 64804).

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/web2.pdf

USE OF DESIGNATED LAND ON-RESERVE FOR AFFORDABLE HOUSING

This research project will investigate and document the issues, impediments and opportunities in using designated land to facilitate affordable housing on-reserve and will communicate the results to First Nation communities and other stakeholders involved in housing on-reserve.

CMHC Project Officer *: Kathy Hague*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available
CIDN : 31691500
STATUS : Ongoing

See also: ABORIGINAL HOMELESSNESS: A SCAN OF URBAN CENTRES, p. 81
RETROFITTING CRAWL SPACES - FIRST NATIONS DEMONSTRATION, p. 10

CHILDRENS ENVIRONMENTS

HOUSING, NEIGHBOURHOODS AND CANADIAN CHILDREN'S HEALTH OUTCOMES

This External Research Project will use Cycles 1 to 5 of the National Longitudinal Survey of Children and Youth (NLSCY) to examine whether and how much a family's housing choices (owned home, unassisted rental, assisted housing, single family, row housing, etc.) affect child health outcomes. The research will seek to identify which housing and neighbourhood characteristics associated with home ownership, rental, assisted housing and/or type of housing have impacts on health outcomes, and which do not, and how these characteristics interact with housing choices to affect child health outcomes.

CMHC Project Officer *: Fanis Grammenos*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 36260205
STATUS : Ongoing
NEW

2007-2008 FUNDING FOR THE INTERGOVERNMENTAL COMMITTEE ON URBAN AND REGIONAL RESEARCH (ICURR)

CMHC's contribution to ICURR for 2007-2008. ICURR's mandate is to contribute, through consultation, to the effectiveness of the urban and regional research activities of all levels of government in Canada, by facilitating the exchange of information about such activities.

CMHC Project Officer : *Mark Holzman* **CIDN** : 28940200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : There will be no product for this project

ASSISTING MUNICIPALITIES AND DEVELOPERS IN IMPLEMENTING THE FUSED GRID PLANNING MODEL

This study aims at generating a planning policy document that will guide the growth of East Gwillimbury. The intent is to examine how the Fused Grid planning model can meet the Town's objectives for sustainable growth. Options for growth will be examined with the intent of setting LEED-ND standards for all development in the town. In this context, the Fused Grid will be analyzed and compared to other site planning options in order to assess its potential for meeting sustainability targets. The result will be a policy document that provides substantiated options for accommodating growth in East Gwillimbury.

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 35170200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

COMPARING CANADIAN NEW-URBANIST AND CONVENTIONAL SUBURBAN NEIGHBOURHOODS

This study will gather and compare data from new-urbanist developments and conventional suburban developments to determine if key objectives of these developments have been realized. Variables to be examined include: car usage for weekday urban travel; access to daily destinations; pedestrian connectivity; housing choice; compactness; occupant satisfaction (e.g. pedestrian safety, aesthetic qualities); access to useful public open/green space; and interaction. The study will derive lessons learned about various neighbourhood design features and how well they achieve key objectives. Four new-urbanist developments and four comparable conventional suburban developments have been chosen and surveyed, and an interim report has been submitted and reviewed. Data analysis is complete and the final report will be submitted for review in early fall.

CMHC Project Officer : *Lynn Armstrong* ***CIDN*** : 30610200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

CONTRIBUTION TO THE UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME (UN-HABITAT) FOR CALENDAR YEAR 2007

CMHC's 2007 contribution to the United Nations Human Settlements Programme (UN-Habitat). This is in line with corporate efforts to enhance CMHC's position internationally, similar to recent steps taken to re-engage with the OECD in the area of territorial development. This reconfirms CMHC's traditonal role as the federal focal point for UN-Habitat and will provide expanded opportunities for Canada to engage in and influence international human settlements work.

CMHC Project Officer : *Pierre David* ***CIDN*** : 37440900

Division : CMHC International ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ***NEW***

ETOPIA – CMHC DESIGN CHARRETTE SUMMARY REPORT

In 2004, the partnership of the University of Toronto's Faculty of Architecture, Landscape and Design and ARK Inc., a landscape and architectural firm, organized an urban design charrette as part of the McLuhan International Festival of the Future. Four teams of urban design students, mentored by CMHC staff, University staff and the organizers, proposed interventions on four different sites to envision possible responses to the need of urban densification in the year 2031. The sites considered were: Edwin Ave. Junction Site; Don Mills Shopping Centre Site; Kensington Market Site; and the Docklands Site.

The project brought together multi-disciplinary teams to explore responses to the problems of rapid urban growth and the need for more population density, while considering the influence of Marshall McLuhan's writings on urban and architectural design. Scaled models of the sites were provided, as well as a library of technical materials from CMHC. The final projects were showcased at a panel discussion of experts held as part of a public meeting at the University of Toronto.

Compiled by Mark Chilton and Guela Solow. CMHC Project Officer: Mark Salerno. Toronto: Faculty of Architecture, Landscape and Design, University of Toronto; Architects + Research + Knowledge, Inc. (ARK), Canada Mortgage and Housing Corporation, 2005. 32 pages (1924 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_eTOPIA_W.pdf

SOCIAL INCLUSION AND URBAN FORM: AN EXPLORATORY RESEARCH STUDY: FINAL REPORT

Social inclusion has become a topic of growing interest among makers of social policy and researchers. In response, CMHC commissioned research to explore the role that a city's physical attributes, such as the pattern of streets, land use, open spaces, or transportation connections to other neighbourhoods, play in a community's social development. Housing, given its role in the urban landscape, is a major factor for consideration.

This research project explored the link between urban form and social inclusion in a Canadian context. The aim of the study was to review existing research about the impact of urban form and social inclusion; to identify emerging thinking; discover what other research is being done and identify research gaps.

The three-part research strategy consisted of a literature review, interviews with key Canadian informants and a panel discussion. All three approaches tried to answer questions such as:

- What is commonly understood by the term "social inclusion"?
- What are the interactions between urban design and social inclusion and what factors affect them?
- What qualities of physical neighbourhood/community environment and features lead to higher degrees of social inclusion and well-being, and vice versa?
- Are there individual characteristics of community design that play a greater role in contributing to the well-being of the inhabitants, such as parks, public space, mix of housing, other land use and so on?
- What can be learned from existing research about urban form and social integration? What are the main gaps that should be researched? Do those gaps involve quantitative or qualitative research?
- What indicators exist to measure the different dimensions of the relationship between the physical and the social aspects of a neighbourhood or a community?

Prepared by Margaret Eberle and Luba Serge. CMHC Project Officer: Denis Losier. Ottawa: Canada Mortgage and Housing Corporation, 2007. 95 pages (1158 KB)

CITY PLANNING AND HUMAN SETTLEMENTS

Note: No. 07-007 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site. (Order number 65429)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_Social_inclusion.pdf

CONTAMINATED LANDS

NATIONAL REVIEW - ENVIRONMENTAL REGULATORY SCAN FOR CONTAMINATED LANDS

This project will identify and document the various environmental statutes, regulations and agencies governing contaminated lands that are applicable to residential construction (multiple projects). The information obtained will be used to develop an inventory of regulations and laws that govern the requirements for Environmental Site Assessments (ESA's).

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 36190200
STATUS : Ongoing

OVERCOMING BARRIERS TO BROWNFIELD REDEVELOPMENT

This project is providing support to the Canadian Brownfield Network, aboutRemediation.com and the Ontario Centre for Environmental Technology Advancement (OCETA), for activities that encourage and build the capacity of key stakeholders for brownfield redevelopment. The project includes support for brownfield knowledge workshops which will be held across Canada. To date, workshops have been held in Saint John, New Brunswick and in various cities in Ontario.

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32690200
STATUS : Ongoing

COOPERATIVE AND NON-PROFIT HOUSING

DEVELOPING A STANDARD SET OF FLEXHOUSING™ / HEALTHY HOUSING™ FLOOR PLANS AND DETAILS FOR NON-PROFIT HOME BUILDERS: FINAL REPORT

The CMHC retained Levitt Goodman Architects to develop a standard set of floor plans, elevations, construction details and specifications for use in the factory production of affordable housing units. The study parameters envisioned that this prototype would be flexible enough to translate into several housing typologies while lending itself to the various techniques of the manufactured housing industry.

A literature review and analysis of selected non-profit projects formed the initial framework for the development of the design. The literature review included designs from a diverse range of examples including Habitat for Humanity's built projects, projects by Dan Hanganu Architect from the early 1980's to 2005 and published material on the Grow Home and Next Home developed by McGill University's Low Cost Housing Program.

Six design principles were established and guided the development of the prototype which addressed all the relevant criteria established at the outset of the study.

No. 1: The prototype is not a fixed set of dimensions.
No. 2: FlexHousing™/Healthy Housing™ concepts incorporated to the maximum extent possible.
No. 3: The prototype should adhere to Universal Design principles wherever possible.
No. 4: The prototype should be adaptable to the full range of manufactured construction processes.
No. 5: The prototype will incorporate conventional construction technology and the typologies will be achievable in combustible construction.
No. 6: The prototype will incorporate energy efficiency beyond code minimums.

The housing typologies envisioned by the study included single family dwellings, semi-detached houses, row houses and small apartment buildings. The prototype module successfully meets the goals of the study, combining to create all of the aforementioned housing types and incorporating established principles of the FlexHousing™ concept developed by the CMHC.

Prepared by Levitt-Goodman Architects Ltd. CMHC Project Officer: Collinda Joseph. Ottawa: Canada Mortgage and Housing Corporation, 2006. 73 pages (4124 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/FinalFlexHousingReport.pdf

FIN DES ACCORDS D'EXPLOITATION : DÉFIS ET OPPORTUNITÉS POUR LES COOPÉRATIVES D'HABITATION QUÉBÉCOISE

This study deals with the phenomenon of the end of operating agreements for housing co-operatives. An operating agreement is the document signed by the co-operative and a government agency, for example, la Société d'habitation du Québec (SHQ) or Canada Mortgage and Housing Corporation (CMHC). The agreement specifies what form of assistance the co-operative will receive, disbursement procedures for the assistance and the conditions with which the parties must comply—their rights and obligations for the duration of the agreement.

Although there are exceptions, agreements generally run for 25 to 50 years and generally coincide with the duration of the mortgage loan and, depending on the program, with the period of subsidy disbursement. The end of mortgage payments is an opportunity for any homeowner. However, the housing co-operative, because of the nature of its work and because of its clientele, faces several challenges: ensuring that its housing is affordable for its low-income members without relying on operating subsidies or housing assistance; preserving the physical condition of its dwellings; protecting the collective ownership of its buildings; and, if possible, financing the expansion of its co-operative stock.

The study tries to better define the impacts that the end of operating agreements will have on Quebec's housing co-operatives:

- At the financial level, how will they be positioned at that time? How will they ensure the affordability of their housing without subsidies? Will the amortization of their mortgage loan allow them to balance their budgets while serving their low-income members? Will they be able to maintain the social diversity of their membership?
- At the management level, are the co-operatives well informed and prepared for this eventuality? What decisions must they make now to ensure a smooth transition?

- What will be the state of the co-operative stock once the agreements have expired? Will the co-operatives be able to finance renovations and replacements? Will they be able to contribute to the financing of new housing projects or to expansion?
- In terms of sustainability, is the stock threatened by privatization? How can we preserve the heritage of co-operative housing?

The study tries to assess more precisely the human, financial and legal impacts of this phenomenon, particularly with regard to the housing stock held by Quebec housing co-operatives. After having outlined a profile of the co-operative housing sector, the study presents the content of the operating agreements and their evolution based on the various assistance programs. The first component of the study is a synopsis of the research on operating agreements and their expiration. The study also provides a quantitative description of current agreements and a calendar of their expiration dates, by program category.

The second component is a summary analysis of the impacts that agreement termination will have on social housing stock, as well as the economic, human and legal impacts on housing co-operatives. Economic and human impact analyses are based on two research methods:

- A case study of 25 housing co-operatives that have agreed to inspections of their properties and their financial status;
- A survey of more than a hundred presidents of housing co-operatives.

The study also examines the legal impacts, based on examination of the most recent laws and the original texts of the agreements for the various programs. The study points out obligations stemming from the agreements and obligations that remain after the agreements expire and suggests solutions for the sustainability of co-operative residential stock and its ability to maintain its social contribution.

The third and last component presents opinions collected from experts consulted by the researchers. The study concludes with a summary of the main findings and an attempt to uncover areas that require priority attention.

Study conducted by Confédération québécoise des coopératives d'habitation under the direction of Allan Gaudreault, consulting analyst, Habitation et développement communautaire. CMHC project officer: Jean Gratton. Ottawa: Canada Mortgage and Housing Corporation, 2007 (External Research Program Research Report) ca 138 pages (1307 KB)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/findesaccords_w.pdf

SUSTAINING THE NON-PROFIT SECTOR IN BRITISH COLUMBIA, PHASE II

The Sustaining the Non-Profit Housing Sector in B.C., Phase II project will provide a range of workable solutions to the concerns identified by non-profit housing providers in Phase I of the study and which have to do with: i) expanding the sharing of services/resources and extending bulk purchase opportunities, ii) attracting, training and managing volunteers more effectively, and iii) increasing the scale and professionalism of fund raising. The goal of this project is to develop options which effectively address each of the problem areas and are flexible enough to appeal to housing societies with a broad range of management styles, geographic locations and operational priorities.

CMHC Project Officer : *Stephen G Hall*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 34240200

STATUS : Ongoing

ABORIGINAL HOMELESSNESS: A SCAN OF URBAN CENTRES

The intent of this project was to gain a better understanding of Aboriginal homelessness in urban centres in Canada, including developing a better profile of Aboriginal homeless people in urban centres; determining trends in the causes and conditions of urban Aboriginal homelessness; examining current and emerging methods of addressing urban Aboriginal homelessness; and examining the appropriateness of services that are, or can be, available to the urban Aboriginal homeless population.

CMHC Project Officer : *Ian Melzer*

CIDN : 25560200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

EXITS AND RETURNS: AN EXPLORATORY LONGITUDINAL STUDY OF HOMELESS PEOPLE IN WINDSOR-ESSEX COUNTY

Research indicates that a significant number of homeless people have experienced multiple episodes of homelessness. The 'homeless career' of an episodically homeless person is characterized by a recurring pattern of exits and returns to homelessness interspersed with periods of housing. Thus, for episodically homeless people, the issue is not only getting housing and exiting homelessness but staying housed or if there is a need to move, making a transition to new housing without returning to homelessness. The theoretical and research literature on homelessness suggests that a complex interaction of multiple factors determine exits and returns to homelessness.

This study, an exploratory longitudinal study, attempted to understand the dynamics that underlie such exits and returns. The study set out to accomplish the following four interrelated research objectives:

1) examine exits and returns to homelessness among homeless people in Windsor over a one year period;

2) examine the relationship between various factors and exits and returns to homelessness;

3) using a qualitative research methodology, illuminate the nature and dynamics underlying exits and returns to homelessness over time in order to better understand factors that facilitate exits from homelessness and inhibit a return to homelessness; and

4) map and document a longitudinal research strategy that can be used to explore and understand the 'homeless careers' of people who have experienced multiple episodes of homelessness.

Prepared by Uzo Anucha, Lisa Smylie, Colleen Mitchell and Francisca Omorodion. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2007. 101 pages (673 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_Study_Homeless_PeopleMay24.pdf

HOUSING OPTIONS UPON DISCHARGE FROM CORRECTIONAL FACILITIES: FINAL REPORT

This study examined current programs that assist offenders in finding suitable housing at the time of release from provincial and federal correctional facilities in Canada. The research focused mainly on British Columbia, Ontario and Quebec.

The research was guided by the following questions:

1. What services are available for re-housing on release from federal and provincial facilities?

2. For three selected provinces, what services are available for men, women and youth for re-housing on release (federal and provincial facilities)?

3. Which interventions are believed to be most effective (e.g., release planning, parole, halfway houses)?

4. What services are missing?

5. What assistance is available to people entering correctional facilities in different provinces to retain their housing?

6. How do services vary for men, women and youth? How do they vary for other groups (e.g., Aboriginals, other cultural groups)?

Prepared by Rochelle Zorzi … et al., Cathexis Consulting Inc. CMHC Project Officer: Anna Lenk.
Co-funded by Canada Mortgage and Housing Corporation and the National Homelessness Initiative.
Ottawa: Canada Mortgage and Housing Corporation, 2006. 142 pages (1927 KB)

Note: No. 07-001 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65340)

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/HousingOptionsw.pdf

HOUSING

EXAMINATION OF THE BOUNDARIES BETWEEN HOUSING AND INCOME SECURITY POLICY

The result of this study will increase awareness of the importance of housing in respect to broader social policy and income support policy in particular. This will contribute to the work of the Federal-Provincial-Territorial working group on affordable market housing, and potentially to other exercises such as the development of a market basket for measuring poverty and the design of future income support policy (e.g. National Child Benefit). This study will compare the housing and income support systems in four countries (Canada, United States, United Kingdom and Australia). It will focus on the structure of housing.

CMHC Project Officer *: Brian Davidson*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 30140200

STATUS : Ongoing

HOUSING

FAMILY WELL-BEING, COMMUNITIES AND HOUSING

This External Research Program project will examine family housing need, family well-being and the municipal response. Through this research it will be possible to get a better sense of the extent to which policies related to housing and family well-being are "on the radar" of local governments and to identify the range of strategies and initiatives that municipal governments have put in place to respond.

CMHC Project Officer : *Brian Davidson* **CIDN** : 36260212
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

INDIVIDUALISATION DES COMPORTEMENTS ET MODES D'HABITER

The second half of the last century was strongly marked by a change in living options, and the strong wind of individualization that is blowing over developed societies has generated a proliferation of one-person households. Without any distinction, this phenomenon is affecting all members of society and being felt throughout Canada. After reviewing the situations prevailing in Toronto, Vancouver and Montréal, the study focuses on the housing conditions and residential mobility of single persons aged from 25 to 54 years in the Montréal metropolitan area.

Prepared by Daniel Gill and François Charbonneau, Institut d'urbanisme, Université de Montréal. CMHC Project Officer: Jim Zamprelli. Ottawa: Canada Mortgage and Housing Corporation, 2006. (External Research Program Report) 166 pages (2658 KB)

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/FREjan10.pdf

HOUSING AFFORDABILITY

AFFORDABLE HOUSING FOR FAMILIES: ASSESSING THE OUTCOMES

Families who cannot access affordable housing not only face increased housing pressure, but also many other social and economic problems, and risk homelessness. Yet there are currently no new programs in BC for affordable housing for families. This External Research Program project aims to produce important information on outcomes for families in affordable housing for input to policy-making.

CMHC Project Officer : *Ed Nera* **CIDN** : 34380214
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

ANALYSIS OF HOUSING AFFORDABILITY, 1971-2001

This project will examine trends in housing affordability for owners and renters over the period 1971 – 2001 using micro data files from the Census of Canada and Statistics Canada household surveys.

CMHC Project Officer : *Jeremiah Prentice*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 34380202
STATUS : Ongoing

GROWTH MANAGEMENT AND AFFORDABLE HOUSING IN GREATER TORONTO

This research explored 3 hypotheses:
1) Housing stock characteristics are large contributors to emerging Greater Toronto Area patterns of poverty in inner suburbs and lack of social mix in outer suburbs.
2) These patterns are distinctly different from the Greater Toronto Area a generation ago and are becoming similar to those in comparable city-regions.
3) Other cities' efforts to address such issues through growth management point to making affordable housing a part of regional growth management in Toronto.

The following research questions were addressed:
1)To what extent in Greater Toronto are the two trends of lack of income and housing diversity and concentration of lower-income households in inner older suburbs a) occurring in ways different from a generation ago; b) associated with housing stock trends; and c) related to each other?
2) What are the main causes and implications of such patterns in Toronto and other comparable cities in key dimensions such as income, migration, housing production and neighbourhood change?
3) What are the salient concepts, experience and lessons from the U.S. and other research on growth management vis-a vis these trends and challenges and affordable housing?
4) What does all this imply for the need, the potential and the limitations for affordable housing as an aspect of regional growth management for Greater Toronto?

Prepared by Greg Suttor. CMHC Project Officer: Doug Pollard. Ottawa: Canada Mortgage and Housing Corporation, 2006. (External Research Program Research Report) 271 pages (3980 KB)

Note: No. 07-011 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 65560)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Growth_Management(W).pdf

RECYCLING CATHOLIC CONVENTS AND RELIGIOUS INSTITUTIONAL BUILDINGS INTO AFFORDABLE AND ALTERNATIVE HOUSING: THREE CASE STUDIES

This project under the External Research Program will examine the recycling of religious institutional buildings in Quebec City into housing. An inventory of buildings that have been converted will be prepared and three case studies will be analyzed. Interviews will be conducted with the architects, municipal planners, occupants of the buildings and members of the religious order to assess the success of the housing project. Recommendations will be provided for future conversions of similar buildings. A draft report has been received and reviewed and the final report is being prepared.

CMHC Project Officer : *Lynn Armstrong*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 26470205
STATUS : Ongoing

BEST PRACTICES IN DEVELOPING CULTURALLY APPROPRIATE SUPPORTIVE HOUSING MODELS FOR PREVENTION AND TREATMENT OF MENTAL HEALTH / SUBSTANCE USE PROBLEMS

The goal of this project is to identify evidence-based best practices in developing culturally appropriate supportive housing models for persons from ethnoracial / ethnocultural communities with mental health and/or addiction issues and produce a housing development manual that can be used by groups wishing to develop supportive housing for these communities. This will be accomplished by conducting a literature review, reviewing existing housing models and consulting with various stakeholders in Toronto (consumers, families, funders, housing and service organizations) to identify critical issues that must be considered in designing and developing appropriate housing for the target group.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 32890200
STATUS : Ongoing

HOUSING NEWCOMERS IN CANADA: AN ANALYSIS OF LSIC DATA (WAVE 2)

The objective of this External Research Program project is to investigate the relationship between immigration and housing in Canada, using new data from the second wave of the Longitudinal Survey of Immigrants to Canada (collected two years after landing). How are immigrants coping in the Canadian housing market, particularly in Montréal, Toronto, and Vancouver? Are they able to find suitable housing? At what cost, relative to their financial resources? What impacts are immigrants having on these housing markets?

CMHC Project Officer : *Jim Zamprelli*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 36260208
STATUS : Ongoing
NEW

HOUSING SEARCH, BARRIERS AND OUTCOMES FOR NEW IMMIGRANTS AND REFUGEES IN TORONTO'S RENTAL MARKET

The successful integration of immigrants and refugees into a new society is based on their fulfilment of several basic needs. One of the most important, particularly in the initial stages of settlement, is access to adequate, suitable, and affordable housing. This External Research Program study will evaluate the housing experiences of a new and less-well-understood immigrant group in Toronto, Black Africans from former Portuguese colonies.

CMHC Project Officer : *Denis Losier*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 34380217
STATUS : Ongoing
NEW

HOUSING SITUATION AND NEEDS OF RECENT IMMIGRANTS IN THE MONTRÉAL METROPOLITAN AREA

This report is part of a larger project on the housing situation and needs of new immigrants in the Montréal, Toronto and Vancouver metropolitan areas, jointly funded by Canada Mortgage and Housing Corporation and the National Homelessness Initiative, as part of their contribution to the Metropolis Project.

Drawing on a wealth of new information about the housing situation of immigrants, the authors examine four topics. The report begins with a review of the history of immigration in the Montréal metropolitan area and recent trends in the Montréal housing market. The aim is to set the context for understanding the social and housing circumstances that immigrants encounter in Montréal upon arrival.

The next section reviews the housing conditions of immigrants currently living in the metropolitan area. In this section, the authors emphasize the effects of immigrant status, period of arrival, and ethnic and visible minority status on immigrants' housing. Drawing on special tabulations from the 2001 census (made available by Statistics Canada to researchers affiliated with the Metropolis Project), and where possible invoking comparisons with 1996 census data, they examine how the housing situations of immigrants differ from those of their children and other Canadian-born. They investigate the impact of period of arrival on tenure, housing costs, and income. Further disaggregating the immigrant population in Montréal, they also explore differences in housing situations across visible minority subgroups and ethnic origins.

The description of immigrants' access to homeownership is followed by a detailed analysis of Montréal residents who are experiencing affordability problems. Following conventions developed by Canada Mortgage and Housing Corporation, the authors describe the housing costs and household incomes of immigrant households spending at least 30 percent of total pre-tax income on housing, as well as those of a smaller group of immigrant households spending at least 50 percent of total income on housing. Again, the immigrants are disaggregated by immigrant status, period of arrival, visible minority subgroups and ethnic origins.

Information from the first wave of the Longitudinal Survey of Immigrants to Canada (LSIC), conducted by Statistics Canada and Citizenship and Immigration Canada on a representative sample of immigrants who landed in Canada between October 2000 and September 2001, allows the authors to explore how very recently-arrived immigrants find housing and the extent to which their initial housing situations are affordable, adequate and suitable. The LSIC data also enable us to distinguish immigrants on the basis of their immigration class—information not collected for the census. Previous research, based on single case studies or surveys in a single city (Renaud 2003; Rose and Ray 2001; Murdie 2005; Bezanson 2003), has suggested that refugees and refugee claimants have more difficulty than other classes of immigrants finding appropriate housing. The LSIC sample includes refugees selected overseas, but not refugee claimants or others whose immigration papers were processed from within Canada. The LSIC information allows us to explore how immigration class at landing affects housing outcomes in a single metropolitan area, to relate these findings to the local housing market, about which we have detailed information, and to situate the results in a comparative context.

Prepared by Damaris Rose, Annick Germain, Virginie Ferreira, INRS-Urbanisation, Culture et Société, Institut national de la recherche scientifique. CMHC Project Officer: Jim Zamprelli. Ottawa: Canada Mortgage and Housing Corporation, 2006. 96 pages (928 KB)

Nota : Disponible en français sous le titre : La Situation résidentielle et les besoins en logement des immigrants récents dans la region métropolitaine de Montréal

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_bilingual/MontrealW.pdf

HOUSING SITUATION AND NEEDS OF RECENT IMMIGRANTS IN THE MONTRÉAL, TORONTO, AND VANCOUVER CMAS: AN OVERVIEW

This overview provides a synopsis of the findings of a large comparative study of immigrants in the housing markets of Canada's largest metropolitan centres, Montréal, Toronto, and Vancouver. It describes the changing trajectories of immigrants within the housing markets of these three cities, summarizes the housing characteristics of the immigrant population compared with the Canadian born, then focuses on households that are in vulnerable circumstances. Finally, an analysis of the Longitudinal Survey of Immigrants to Canada (LSCIC) provides insight into the experience of immigrants in the housing market within their first few months of settlement.

Prepared by Daniel Hiebert, Annick Germain, Robert Murdie, Valerie Preston, Jean Renaud, Damaris Rose, Elvin Wyly, Virginie Ferreira, Pablo Mendez, and Ann Marie Murnaghan. CMHC Project Officer: Jim Zamprelli. Ottawa: Canada Mortgage and Housing Corporation, 2007, c2006. (Research Report - Distinct Housing Needs Series) 48 pages

Note: No. 07-018 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65682)

Nota : Publié aussi en français sous le titre : Aperçu de la situation et des besoins en matière de logement des immigrants récents dans les RMR de Montréal, Toronto et Vancouver

STATUS : Completed Report (Order no. 65319) and Research Highlight

AVAILABILITY : CMHC Information Products and http://www.cmhc.ca/od/?pid=65319

LONGITUDINAL SURVEY OF IMMIGRANTS TO CANADA (LSIC) - DATA ANALYSIS OF HOUSING-RELATED INFORMATION

This project is a continuation of CMHC efforts to investigate the role of housing and communities as an integrative tool for newcomers, their effects on the housing market, and barriers to their accessing adequate shelter. Research and analysis of the 2001 Census and data from the Longitudinal Survey of Immigrants to Canada will focus on housing needs and preferences, housing conditions, living arrangements, household formation, and housing experiences and histories of newcomers as they evolve towards achieving the goal of integration. Barriers, obstacles and success in the housing market will be examined. This project is a co-venture between CMHC, three Metropolis Centres of Excellence and the National Secretariat on Homelessness.

CMHC Project Officer *: Jim Zamprelli*
CIDN : 31920200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

METROPOLIS PROJECT - PHASE 3

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues through a network of research centres in Canadian universities (Centres of Excellence). The results of the research will be used for the assessment of and development of policies and programs affecting immigrants and new Canadians.

CMHC Project Officer *: Jim Zamprelli*
CIDN : 37430200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

HOUSING AND IMMIGRATION

REVIEW OF CMHC'S NEWCOMER'S GUIDE TO HOUSING

This is a review with stakeholders to identify ways of increasing the usefulness and impact of CMHC's Newcomer's Guide to Housing.

CMHC Project Officer : *Jim Zamprelli* — ***CIDN*** : 36900200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

HOUSING EXPORT OPPORTUNITIES

ACCEPTANCE OF CANADIAN SYSTEMS IN THE EUROPEAN UNION

The purpose of this project is to research market acceptance and regulatory approval of Canadian building products in European markets.

CMHC Project Officer : *Jorge Malisani* — ***CIDN*** : 34520900

Division : CMHC International — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

ASSESSMENT OF BRANDING AND CERTIFICATION PROCEDURES IN FRANCE

The study will produce an action plan for the recognition of Canadian construction technology in order to facilitate market access and exports of Canadian construction systems and products. This study will serve as a basis for discussions with Canadian partners in view of developing a shared vision and a strategy for the approval and promotion of Canadian technology and products in France. The study will not be made public until the discussions with the partners have been completed.

CMHC Project Officer : *Guy Lemieux* — ***CIDN*** : 33440900

Division : CMHC International — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

BEST PRACTICE GUIDE FOR HOUSING EXPORTERS TO THE UNITED KINGDOM

This research project will produce a document to assist Canadian exporters of houses to the United Kingdom. It will explain legal issues, project process and management practices, and service expectations. A glossary will be included of common UK and Canadian building terms.

CMHC Project Officer : *Louis Musto* — ***CIDN*** : 33390900

Division : CMHC International — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

COMPETITIVE COST AND PERFORMANCE STUDY IN FRANCE

The purpose of this project is to conduct a study on building costs, energy consumption and acoustic properties comparing traditional French construction to Canadian wood-frame technology. The goal is to compare the R-2000/Super-E standards to standards used in France, including future standards like RT-2005/RT-2010, and to analyse total costs attached to the Canadian housing system compared with traditional construction and other wood construction available in France. The costs will include building costs, energy costs, transportation costs and other costs to arrive at a global perspective. If possible, comparisons with standards used in other French speaking countries will be added. The project outcome will be a study report and a specification sheet for a typical Canadian housing system to be used by CMHC and Canadian manufacturers.

CMHC Project Officer : *Guy Lemieux* ***CIDN*** : 37040900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

DEVELOPMENT OF CANADIAN LABELLING PROGRAM FOR CHILE

The Labelling program would provide foreign buyers with the assurance that the homes originated from Canada, were successfully certified, and were adequately installed on-site to ensure expected system performance. The program will also offer training and after sales service support. On the other hand, Canadian participant members would benefit from a differentiation from the local and foreign competitors, an increased credibility based on the compliance to an independent quality control process which maximizes Canadian housing recognition and reputation abroad, and a protected trade mark, etc.

CMHC Project Officer : *Guy Lemieux* ***CIDN*** : 28860900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DISTRIBUTION AND BUILDER RESEARCH IN SELECTED U.S. MARKETS

The project will study distribution channels and builder buying preferences for specific products in some areas of the United States. The focus for this project will be Middle Atlantic and South Atlantic regions of the U.S. Other areas could also be included in the study. Distribution for the following products will be examined: insulation, solar panel, high-end roofing, and windows. Builder buying preferences will be studied for staircase and millwork. The project outcome will be market intelligence reports for specific building products and U.S. regions.

CMHC Project Officer : *Sanjar Farzaneh* ***CIDN*** : 37030900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

EXPORTING TO RUSSIA: LESSONS LEARNED FROM THE CANADIAN HOUSING INDUSTRY PROJECT

The objectives of this project are:

- to identify needs, challenges, and opportunities in the Russian housing market;
- to investigate the operational experience of Canadian housing exporters in Russia;
- to identify export barriers, business opportunities and the challenges facing Canadian housing exporters in Russia;
- to identify key success factors employed by Canadian housing exporters in Russia;
- to assess the comparability between the requirements of the Russian housing market and the capabilities of the Canadian housing industry; and
- to assess CMHC's past role in assisting the Canadian housing export industry to market effectively in Russia.

CMHC Project Officer : *Mietka Zieba*
CIDN : 28030900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

FEASIBILITY STUDY ON ONTARIO WOOD PRODUCTS EXPORT ASSOCIATION

This project consists of a feasibility study on the creation of an export association for wood products in Ontario. The results of the study will be disseminated among interested stakeholders.

CMHC Project Officer : *Sanjar Farzaneh*
CIDN : 36150900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

FOLLOW-UP TO 2006 MARKET RESEARCH ON HARDWOOD FLOORING & ENGINEERED WOOD FLOORING IN THE UK

Based on a 2006 market study of hardwood and engineered wood flooring products to the United Kingdom, the purpose of this project is to conduct more focused research for Canadian companies on the commercial opportunities raised in the report based on their specific needs in order to increase their export sales.

CMHC Project Officer : *Terry Robinson*
CIDN : 36340900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

FRANCE BUILDING PRODUCTS REPORTS

The research obtained from the project will result in the development/production of "Fact Sheets" that give information on market conditions and regulatory issues on selected products that can be exported to the priority countries that CMHC International works with.

CMHC Project Officer : *Guy Lemieux*
CIDN : 33330900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

IDENTIFICATION AND DEVELOPMENT OF BUSINESS OPPORTUNITIES IN THE FRENCH MARKET: PREFABRICATED HOMES

The purpose of this project is to provide research on builders, developers and residential projects that could present business opportunities for Canadian manufacturers of prefabricated products. The results of the study will enable CMHC to better guide the industry toward the best business opportunities, in order to increase the Canadian presence on the French market. This document will be available on CMHC's web site. The project involves a second part that will be funded exclusively by Canadian companies interested in obtaining matchmaking services with French contractors.

CMHC Project Officer : *Guy Lemieux* ***CIDN*** : 33430900

Division : CMHC International ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

IDENTIFICATION OF BUSINESS OPPORTUNITIES IN THE IRISH MARKET

The project will research opportunities in the Irish market for Canadian building product and system manufacturers by identifying builders, housing projects, and buyers of building products. Based on market research and interviews, profiles will be developed for these potential opportunities. A report on these opportunities will be produced for distribution by CMHC.

CMHC Project Officer : *Roger Leger* ***CIDN*** : 33410900

Division : CMHC International ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

IDENTIFICATION OF BUSINESS OPPORTUNITIES IN THE U.K. MARKET

The project will research opportunities in the U.K. market for Canadian building product and system manufacturers by identifying builders, housing projects and buyers of building products. Based on market research and interviews, profiles will be developed for these potential opportunities. A report on these opportunities will be produced for distribution by CMHC.

CMHC Project Officer : *Eliska Jerzabek* ***CIDN*** : 33400900

Division : CMHC International ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

JAPAN - FURTHER ANALYSIS ON BUSINESS OPPORTUNITIES IN THE SENIORS HOUSING MARKET IN THE TOKAI REGION

The purpose of this project is to develop a cost and life cycle analysis between a large scale wood frame panelized building and a traditionally built Japanese concrete large scale building.

CMHC Project Officer : *Laura Diakiw* ***CIDN*** : 33530900

Division : CMHC International ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MARKET DEVELOPMENT IN FRANCE FOR THE CANADIAN HOUSING INDUSTRY

The project has two primary objectives: act as a local resource for CMHC to provide concrete assistance in view of achieving its development objectives on the French housing market, and identify and develop business opportunities and contacts in France for Canadian housing systems and components manufacturers in general.

CMHC Project Officer *: Guy Lemieux*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 37080900
STATUS : Ongoing

MEXICO RESEARCH ON MARKET INTELLIGENCE AND OPPORTUNITIES FOR BUILDING PRODUCTS

The project will describe and assess the distribution channels in Mexico for selected building products and identify potential Mexican buyers. For each selected building product, a summary report on market opportunities and distribution channels, key contacts in the distribution channels and other contacts will be produced. The report is intended for Canadian building product manufacturers interested in the Mexican market.

CMHC Project Officer *: Paulina Barnes*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 33460900
STATUS : Ongoing

OVERVIEW OF CANADIAN EXPORT POTENTIAL IN THE RESIDENTIAL HIGH-RISE SECTOR

The study will provide an overview of Canadian strengths in the residential high-rise sector and report on areas where Canadian companies have a technological or an expertise advantage in foreign markets.

CMHC Project Officer *: Guy Lemieux*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 36270900
STATUS : Ongoing

PROVIDE TECHNICAL SUPPORT TO CANADIAN SUSTAINABLE COMMUNITY DEVELOPMENT IN CHINA

This project provides training to a Chinese development company in Canadian methodology and practices that produce sustainable communities through the delivery of information on Canadian projects and programs. This work will also contribute towards the development of measurements and rating tools for broadly focused international sustainable planning practice at large.

CMHC Project Officer *: Nellie Cheng*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 33500900
STATUS : Ongoing

RESEARCH BUSINESS OPPORTUNITIES IN CHINA

This project will consist of identifying and documenting business opportunities in China and matching them with Canadian manufacturers. This project will also be funded by Canadian manufacturers participating in the program. A report will be produced on the results of the program.

CMHC Project Officer *: Tulio Conejeros* — **CIDN** : 37070900

Division : CMHC International — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

RESEARCH ON CANADIAN GREEN BUILDING PRODUCT CAPABILITIES

This project will develop an inventory of Canadian green building products for promotion in the USA market.

CMHC Project Officer *: Louis Musto* — **CIDN** : 33920900

Division : CMHC International — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

RESEARCH ON THE USA RESIDENTIAL GREEN BUILDING INDUSTRY

The Canadian industry requires better intelligence on the green building movement in the USA to assist them to make export business decisions. The research will provide a description of the main factors driving the construction of green buildings, criteria for defining green products and buildings, identification of the main organizations involved in this area, explanation of the major programs and product rating systems, and recommendations on how best to take advantage of this rapidly growing area of the construction industry in the USA.

CMHC Project Officer *: Louis Musto* — **CIDN** : 36310900

Division : CMHC International — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

RESEARCH REPORT ON MARKET OPPORTUNITIES IN CHINA

This report:

- provides an overview and an analysis of China's real estate market;
- outlines challenges and difficulties for the Canadian housing industry in the China market;
- describes the factors that have lead some Canadian companies to be successful in the Chinese market;
- lists key issues to remember when doing business in China;
- lists Canadian housing products that have the best opportunity for success and outlines specific business opportunities for Canadian manufacturers in the Chinese real estate market.

Prepared by Gary Liu, ACICC Trading International Co., Ltd. CMHC Project Officer: Tulio Conejeros. Ottawa: CMHC International, c2007. 16 pages

Nota : Publié aussi en français sous le titre : Rapport de recherche sur les débouchés commerciaux en Chine

STATUS : Completed Report

AVAILABILITY : Product is available on the web at http://www.cmhc-schl.gc.ca/en/hoficlincl/cmhcin/suexin/inma/upload/RR_Market_Opportunities_china_en.pdf

ROADMAP TO PRODUCT APPROVALS IN RUSSIA

The study will address the following issues and information needs: the degree to which certification is mandatory, relationships between product certification and building products, alternate routes for local and national approvals, the respective roles of competing Russian agencies and jurisdictions, identification of key contacts within these agencies, the acceptability of Canadian standards and test data. For the specific product categories to be studied in detail, additional information will be collected on technical requirements, relevant Russian or international standards, etc.

***CMHC Project Officer** : Mietka Zieba*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 28880900
STATUS : Ongoing

STUDY ON DISTRIBUTION CHANNELS AND CONSTRUCTION PROJECTS IN MEXICO

This project will describe the distribution channels in Mexico for selected building products, and will identify market opportunities among high-end builders and construction projects.

***CMHC Project Officer** : Paulina Barnes*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 34720900
STATUS : Ongoing

STUDY TO IDENTIFY THE CHANGES HAPPENING TO THE JAPANESE BUILDING REGULATIONS AND THEIR IMPACT ON CANADIAN INDUSTRY ACTIVE IN JAPAN

A document will be produced in English to be distributed to Canadian housing suppliers of products and systems. The document will outline a path by which the Canadian housing industry can follow to meet current changes happening in the regulatory environment which will assist sustaining and expanding market share. The document will provide an overview of legislation and regulations that guide the building industry in Japan; describe type approvals and product specific approvals and what they mean and in which cases they can be used; describe the various testing and approval facilities, etc.

***CMHC Project Officer** : Laura Diakiw*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 27380906
STATUS : Ongoing

SURVEY OF US AND CANADIAN MODULAR BUILDERS DOING BUSINESS IN MAINE

The survey will aim at uncovering the elements which presently foster a negative view of Canadian modular builders in Maine and the work they conduct under the guise of delivering a manufactured home to the intended site. The result of the study is intended for both the Maine Modular Builders Association and CMHC International.

***CMHC Project Officer** : Ronald Drisdelle*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 34370900
STATUS : Ongoing

DEVELOPMENT OF A HOUSING POLICY SIMULATION MODEL: A REVIEW OF A REGIONAL CGE MODEL FOR HOUSING POLICY ANALYSIS IN CANADA

The purpose of this project was to assess the feasibility of creating a housing policy simulation model for Canada based on Rainer vom Hofe's 2002 PhD dissertation entitled "A Regional Computable General Equilibrium (CGE) Model for Housing Policy Analysis: The Case of New York State". It reviewed vom Hofe's dissertation, with a view to understanding the workings of the CGE model. It assessed the potential applications of the CGE model, with and without modification, in simulating Canadian policy with housing implications. Finally, it discussed the feasibility, in terms of benefits, costs, data and timing, of developing a housing policy simulation model for Canada.

Prepared by Regionomics. CMHC Project Officer: Kamal Gupta. Ottawa: Canada Mortgage and Housing Corporation, 2007 194 pages

STATUS : New Completed Report

AVAILABILITY : On a loan basis only from the Canadian Housing Information Centre

UPDATE 2002 LEVIES, FEES, CHARGES AND TAXES ON NEW HOUSING

This project will update and expand the contents of the 2002 study, "Levies, Fees, Charges and Taxes on New Housing." The project will review and critique the methodologies employed in earlier studies to estimate government-imposed costs on new homeownership and rental dwellings, with a view to recommending an improved methodology. It will then document and quantify the separate and cumulative impact of government-imposed costs on new homeownership and rental dwellings in Canada. Finally, it will analyse the changes in government-imposed costs and identify how these costs have trended over time. The final report will be of interest to home builders and developers as well as municipal and provincial housing officials.

CMHC Project Officer *: Steven Ehrlich*

CIDN : 34040200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

HOUSING INDICATORS AND DATA

CANADIAN HOUSING OBSERVATORY - 2007

The Canadian Housing Observer, is a flagship CMHC publication which provides comprehensive and authoritative reporting on the state of Canada' s housing. The Observer is published annually and is available in print and electronic formats. The analysis presented in the Observer, coupled with the extensive on-line data resources, provides Canada's housing sector with an indispensable tool for identifying, monitoring and addressing housing trends and issues. These data tables provide additional information on national, regional, local and off-reserve housing markets and housing conditions across Canada. It is an ideal resource for housing planners and policy makers; housing researchers, educators and students; home builders; housing finance and real estate professionals; and municipal, provincial, and federal housing specialists.

CMHC Project Officer *: Sandra Baynes*

CIDN : 37340200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

HOUSING INDICATORS AND DATA

IMPACT OF BUSINESS CYCLES ON CORE HOUSING NEED

This project will provide policy makers and researchers with an understanding of the impact of various changes in economic conditions on housing need. This project will also help policy makers understand the potential cyclical aspects of housing need, and understand, for example, how policy responses to an increase in housing need caused by a temporary surge in unemployment is different from an increase in housing need caused by persistent increases in housing and related costs, such as interest rates, utility rates and property taxes. This project will therefore decompose changes in housing need into portions attributable to cyclical factors and those attributable to structural considerations.

***CMHC Project Officer* :** *Bruno Duhamel*
CIDN : 35010200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SPATIALITY OF HOUSING PRICE RISKS

This External Research Program study is intended to examine the spatiality of housing price risks, price risks being defined as price fluctuations over time. Its objectives are to describe the spatial pattern of price risks and test the main hypothesis that price risks are correlated with the residential built environment. The study will also identify the socioeconomic characteristics of those living in high-risk areas.

CMHC Project Officer : Robert Figueroa
CIDN : 36260214
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

HOUSING MARKET

ANALYSE DE LA STRUCTURE DU MARCHÉ IMMOBILIER DE MONTRÉAL

The housing market across Quebec and in the Montréal metropolitan area has been exceptionally dynamic for the past few years. In the mid-1990s, there were fewer than 8,000 housing starts annually in the Montréal metropolitan area. Since 2002, this number has reached more than 20,000 units annually. In addition to the rise in housing starts, housing prices have also increased significantly in recent years.

There are more and more articles on this issue in newspapers and trade magazines. Some talk about real estate bubbles. Others point out that the pressure exerted in Montréal just represents a normal recovery, after some difficult years. For other stakeholders, the current situation is due to structural changes that will affect the market for several more years. What is happening exactly? This question is justified in that a better understanding of this phenomenon will provide a better grasp of housing market trends.

Canada Mortgage and Housing Corporation, in cooperation with the Société d'habitation du Québec, wanted to document this phenomenon.

This study aims to:

- determine if the trends observed on the housing market in the Montréal area are attributable to structural or cyclical changes;
- identify these changes and their scope and assess whether they are temporary or permanent; and
- define the impacts of these changes on the housing market in the coming years.

These analyses are completed through a survey of market stakeholders to gather their perceptions. The reflection is then extended to the other metropolitan areas across Quebec, namely, Gatineau, Sherbrooke, Québec, Trois-Rivières and Saguenay, in order to analyze the market conditions.

Prepared by Daniel Arbour & Associés. CMHC Project Manager: Bruno Duhamel in cooperation with the Quebec Market Analysis Centre and the Société d'habitation du Québec. Ottawa: Canada Mortgage and Housing Corporation, 2006. 236 pages (2913 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/S90009jan12_07.pdf

HOUSING RESEARCH

HOUSING ISSUES OF SEASONAL WORKERS IN CANADA: AN ANALYSIS REPORT

Using existing data and interviews with industry sector councils, this study documents the nature of the housing issues seasonal workers face across Canada. First, it provides a description of the seasonal work force, identifying the most highly seasonal occupational and industry groups. It then describes the demographics and characteristics of seasonal workers themselves with regards to age, gender, education, skill levels and other relevant factors. Finally, this study provides an in-depth look at the housing issues seasonal workers face, with a special focus on the role of employers in addressing these issues.

Prepared by Praxis Research & Consulting Inc. CMHC Project Officer: Bruno Duhamel. Ottawa: Canada Mortgage and Housing Corporation, 2007. 231 pages (1633 KB)

Note: No. 07-010 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 65553)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/HousingissuesseasonalW.pdf

OVERVIEW OF THE CURRENT STATE OF KNOWLEDGE ON THE NATURE AND EXTENT OF BROADER (NON-HOUSING) SOCIETAL OUTCOMES OF HOUSING

This research will provide an overview of the current state of knowledge on the nature and extent of broader (non-housing) societal outcomes of housing related to education, skills development and employment. It will review existing empirical evidence of the role of housing in contributing to broader societal outcomes, assess the current state of knowledge regarding linkages between housing and broader societal outcomes, identify data gaps, examine related methodological challenges and identify future research challenges and opportunities.

CMHC Project Officer : *Ed Nera*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 34430200

STATUS : Ongoing

HOUSING RESEARCH

UNDERSTANDING THE STATUS OF VISITABILITY

At the present time there is a lack of available Visitable housing in Canada, a lack of knowledge of the diffusion of Visitability in Canada and a general lack of acceptance of Visitability by developers, policy makers, jurisdictions, organizations, and individuals due to a lack of knowledge of what Visitability is. The goal of this External Research Program study is to analyze the progress and diffusion of Visitability in Canada and determine the barriers, facilitators, best practices, gaps, trends and issues.

CMHC Project Officer : *Jim Zamprelli*	***CIDN*** : 34380215
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

INFRASTRUCTURE

DEVELOPMENT OF COSTING MECHANISM(S) TO FACILITATE SUSTAINABLE COMMUNITY PLANNING

The purpose of the project is to develop a mechanism(s) that will allow community planners to effectively calculate and convey the full, accurate, long and short term public infrastructure costs of both conventional and more sustainable community planning scenarios. Phase 1 will identify relevant commercially available or partially developed infrastructure costing models and tools and community scenario building tools; identify current relevant sources of financial costing information related to the direct, indirect and external costs affected by development; document current costs for a full range of conventional and alternative infrastructure elements; identify the key costs affected by urban form and the factors that affect them most; apply the key costs to six development scenarios and develop cost/revenue statements for each scenario; construct a methodology to permit planners to effectively calculate and convey reliable net public cost projections for a full range of sustainable community planning scenarios; and if no tool currently exists, develop a framework for a methodology or tool by which the diverse sources and currently unrelated tools used above might be integrated into a single costing/scenario development exercise. Phase 2 of the project, which is currently undergoing internal testing has developed a costing scenario tool using the data collected in Phase 1. This user friendly costing mechanism will allow planners, politicians and other stakeholders to quickly compare and adjust the full, life cycle (75 year) costs of various planning scenarios during the community planning process.

CMHC Project Officer : *Douglas B Pollard*	***CIDN*** : 26950200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

LAND DEVELOPMENT

PROFILE OF THE LAND DEVELOPMENT INDUSTRY IN CANADA

The key objective of this study is to develop a profile of the land development industry in Canada. Critical to achieving this objective is gaining a clear understanding of what the land development industry is. To accomplish this, the research will be based on an examination of data from Statistics Canada and a review of existing literature. The literature review will serve to define land development, including its role in the national economy generally, and the residential construction industry in particular.

A nationwide industry survey will be a central element of the research. Interviews will be conducted in 16 major urban centres. Survey results will be used to identify drivers of change in the land development industry, such as environmental and public policy initiatives, and will also allow the analysis of how the industry has adapted and developed in response to these drivers. The results of the survey will also be used to identify challenges facing the land development industry over the next 10 years.

CMHC Project Officer *: Bruno Duhamel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 32540200
STATUS : Ongoing

PERSONS WITH DISABILITIES

EFFECT OF SNOW AND ICE ON EXTERIOR RAMP NAVIGATION BY WHEELCHAIR USERS

Winter represents the most difficult season for people with mobility deficits. These difficulties include slips, falls, increased walking effort, and snow-ice wheelchair obstructions. Considering the amount of time Canadians spend in winter, a remarkably small amount of literature exists on non-sporting winter activities. As a result, guidelines and standards for buildings are predominately based on "dry-land" studies. In the case of residential access ramps, anecdotal feedback from wheelchair users identifies problems with winter accessibility due to the snow-ice surface properties.

CMHC Project Officer *: Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 36260211
STATUS : Ongoing
NEW

EVALUATION OF CEILING TRACK AND LIFT SYSTEMS

This study researched difficulties experienced by people who have Ceiling Track and Lift Systems (CTLS) installed in their homes and best solutions to those difficulties. CTLS make it easier to move an individual safely from one room to another. In particular, as children get older parents have increasing difficulty carrying and moving their children. Caretakers of adults with severe physical disabilities also have the same difficulties. Using a CTLS eases many of the problems parents and caretakers face. While a CTLS is useful and practical, there are a number of existing and potential problems about the safety, user satisfaction and other aspects of a system.

Prepared by Ryan Kanigan, Peak Research, Inc. CMHC Project Officer: Collinda Joseph. Ottawa: Canada Mortgage and Housing Corporation, 2007. 71 pages (2219 KB)

STATUS : Completed Report
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Ceiling%20tracksMay08.pdf

HOUSING THE INTELLECTUALLY DISABLED IN INTERNATIONAL COMMUNITIES: IDENTIFYING RELEVANT PHYSICAL AND GOVERNANCE STRUCTURES

The Saskatchewan Association For Community Living (SACL) and Saskatoon Housing Initiatives Partnership (SHIP) have a joint interest in filling the gap in research pertaining to housing persons with intellectual disabilities within a non-congregated, supportive, community context.

CMHC Project Officer : *Jim Zamprelli*
CIDN : 34380218
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

HOW EFFECTIVE ARE BATH GRAB BARS FOR STOPPING A FALL WHEN YOU LOSE YOUR BALANCE? FINAL REPORT

Falls are among the leading causes of fatal and non-fatal injuries, hospitalizations and functional disabilities among seniors. Encouraging the use of bathroom aids, such as grab bars, for safe and independent bathing and toileting has been an important objective of some recent fall prevention programs. Bathroom aids are expected to minimize the effects of many age-related deficits such as impaired balance, co-ordination, range of motion, muscular strength, and endurance. Nevertheless, no study to date has actually examined the effectiveness of bath grab bars and their degree of usefulness in helping individuals regain stability or in preventing falls when balance is lost while getting in or out of the bathtub.

The general objectives of this study were to: a) examine how individuals who had lost their balance used four different bathtub grab bar configurations; b) investigate the effectiveness of these grab bar configurations in preventing falls; and c) identify barriers to the acceptance and use of grab bars.

The specific objectives of the study were to: a) determine whether, and how, study participants used grab bars following an experimentally-induced perturbation of balance; b) determine which grab bar configuration most prevented a fall following a perturbation of balance; c) determine whether the phase of the task performed (such as getting in/out of the bathtub) had an influence on which grab bars were used; and d) study the influence that a loss of balance experienced by participants had on their acceptance of grab bars.

Prepared by Paulette Guitard, Heidi Sveistrup, Donna Lockett, Nancy Edwards, University of Ottawa. CMHC Project Manager: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2007. (External Research Program Research Report) 103 pages (5236 KB)

Note: No. 07-016 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 65670)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/BathGrabBars(w).pdf

INTERIOR DESIGN STUDENT COMPETITION FOR FLEXHOUSING DEMONSTRATION FACILITY AT CCHT

This is a student interior design competition where students will create inexpensive interior design ideas for the demonstration FlexHouse at the Canadian Centre for Housing Technology (CCHT). The FlexHousing demonstration facility at CCHT will be renovated to incorporate the winning designs.

CMHC Project Officer : *Ian Melzer*
CIDN : 32910200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

LONGITUDINAL STUDY OF HOUSING FOR MENTAL HEALTH CONSUMER-SURVIVORS

This research project will compare the outcomes of two mental health housing programs, supportive housing and rent supplement, including tenants' satisfaction and preferences.

***CMHC Project Officer** : Ian Melzer*	***CIDN*** : 34380213
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

PATTERNS OF USE OF DIFFERENT TOILET GRAB BAR CONFIGURATIONS

A previous study looking at different toilet grab bar configurations showed that ambulatory and non-ambulatory seniors highly prefer the presence of a grab bar on both sides of the toilet seat contrary to American and Canadian recommended guidelines. This External Research Program study will focus on the "patterns of use" of six (6) different toilet grab bar configurations having grab bars on both side of the toilet seat.

***CMHC Project Officer** : Luis Rodriguez*	***CIDN*** : 34380216
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

PROFILE HOUSING CONDITIONS OF PERSONS WITH DISABILITIES

The project will access data from Statistics Canada's 2001 post censal Participation Activity Limitation Survey (PALS) for use in identifying the housing conditions and challenges of persons with disabilities. The project will add value to the PALS data by linking them to CMHC&rsquo;s custom 2001 Census-based indicators.

The project will fund the cost of a contractor who will, in consultation with CMHC, develop criteria for data acquisition from Statistics Canada, analyze the data and develop a report on housing conditions and challenges facing persons with disabilities. The contractor will draw on their analyses to identify some of the key areas where improvements could be made to better meet the housing needs of persons with disabilities. CMHC will contact SDC&rsquo;s Office of Disability Issues (ODI) to seek their active input on this research.

Development of data specifications and an analysis plan to guide the research will be developed. Based on the data specifications, Statistics Canada will produce the custom data, which will be analyzed according to the analysis plan developed through the consultations.

***CMHC Project Officer** : Janet Kreda*	***CIDN*** : 35780200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

ESTIMATING THE COSTS AND BENEFITS OF HOME RENOVATIONS TO ACCOMMODATE AGING AND DISABILITY

This project will apply the new CMHC cost-benefit framework, or model, to estimate the costs and benefits of home renovations to accommodate aging and disability relative to long-term care institutionalization. The project will include a national survey, involving personal interviews with at least 250 RRAP-D and HASI program beneficiaries and 200 telephone surveys to generate statistically reliable estimates of the costs and benefits. At least 50 caregivers of program beneficiaries will also participate. Following the conduct of the surveys, the resulting cost and benefits of the renovations will be compared with available data on the cost and benefits of long-term care institutionalization. This project will produce estimates of the costs and benefits, and cost-benefit ratios, of home renovations to accommodate aging and disability. Such estimates would be useful to policy at the Federal/Provincial/Territorial/Municipal levels related to funding such housing renovations and to the health services sector, regarding related support services programs for seniors and persons with disabilities. The societal impact on care giving and the health care sector will be examined.

CMHC Project Officer *: Luis Rodriguez* — ***CIDN*** : 35440200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

URBAN ACUPUNCTURE: A METHODOLOGY FOR THE SUSTAINABLE REHABILITATION OF 'SOCIETY BUILDINGS' IN VANCOUVER'S CHINATOWN INTO CONTEMPORARY HOUSING

One of the consequences of Vancouver's explosive real estate market is the pressure to find housing development opportunities within the urban core, a pressure being felt by Vancouver's Chinatown.

There is a need for careful and thoughtful research into the limitations and potentials of Chinatown's unique urban fabric. Without thoughtful research, Chinatown could face one of two fates: First, Chinatown could be replaced with standard, podium-point, tower condominiums. Second, redevelopment of Chinatown would retain only historic facades as cladding on new buildings, which would result in the loss of the cultural substance of one of Vancouver's oldest neighbourhoods.

This study proposes an economically, environmentally and culturally sustainable approach to the sustainable rehabilitation of four Chinatown "society buildings"—buildings built by benevolent societies and family clan associations that offered housing and assistance to community members—as contemporary housing.

Prepared by Kelty Miyoshi McKinnon and Inge Roecker. CMHC Project Officer: Brian Eames. Ottawa: Canada Mortgage and Housing Corporation, 2007. (External Research Program Research Report) 177 pages (10740 KB)

Note: No. 07-008 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 65644)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Urban_acupuncture(w)_dec12.pdf

See also: Technical Research on Renovation and Inspection, p. 53

AFFORDABILITY CHALLENGES AND RENTAL MARKET DYNAMICS IN SMALL NOVA SCOTIA COMMUNITIES WITH COMMUNITY COLLEGE CAMPUSES

The objective of the work is to understand the capacity of rental markets in small towns in Nova Scotia to provide a range of affordable housing options for residents and for students attending community colleges. The research will focus on Truro, Stellarton, and Port Hawkesbury. The work will consist of a background literature review, market analysis, student profiles, and local resident profiles plus primary research involving stakeholder interviews, student surveys, and focus groups of residents.

CMHC Project Officer : *Roger D Lewis*
CIDN : 36260203
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

BEST PRACTICE GUIDE FOR RESIDENTIAL RENTAL PROPERTY INVESTORS

The objective of this project is to produce the content for a best practice guide for individual residential rental property investors in the Toronto Census Metropolitan Area, a guide which will become a template for developing other city-specific best practice guides for rental property investors. The guide content and accompanying tools will provide detailed information on property acquisition and property management. It will include a profile of the Toronto rental environment and information specific to various property types. This guide will ultimately help raise awareness of the rental investment process and serve as an alternative to outsourcing the management of the properties.

CMHC Project Officer : *Meg Ogden*
CIDN : 30740200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

EXAMINE THE FEASIBILITY FOR BROADER APPLICATION OF HARM REDUCTION STRATEGIES TO PROVIDE STABLE HOUSING FOR SUBSTANCE USERS

A cross-Canada teleforum to share and discuss the results of the CMHC study "Stable Housing for Substance Users (Drug and Alcohol): Lessons for Housing Providers" re: innovative housing programs and related harm reduction strategies will identify best practices and key success factors to replicating the approach across Canada, and will encourage networking and capacity building among agencies providing housing and supportive services to substance users. An article for submission to a peer-reviewed journal will also be produced on the topic of Housing and Services For People With Substance Use and Mental Health Issues.

CMHC Project Officer : *Jim Zamprelli*
CIDN : 35380200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

REGULATIONS IN THE RESIDENTIAL CONSTRUCTION INDUSTRY IN QUEBEC AND THEIR EFFECTS ON THE COST OF RENTAL HOUSING

This research will assess the impact of the variety of regulations affecting residential construction in Quebec on the cost of rental housing. The author will conduct a literature search of residential building regulations and interview experts in the housing industry, including building officials in the Ville de Québec, representatives of the Commission de la construction du Québec (CCQ), l'Association de la construction du Québec (ACQ), the Corporation des entrepreneurs généraux du Québec (CEGQ), and several residential builders. The researcher will estimate the costs of residential construction attributed to these regulations, and their effects on housing rents. A report will be available in December 2007.

CMHC Project Officer : *Barry Craig* **CIDN** : 28920202
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL DEVELOPMENT

CASE STUDIES OF SUSTAINABLE GREENFIELD RESIDENTIAL DEVELOPMENTS

The current approach to residential development that consumes open space on the urban fringe for single-detached dwellings on large lots is recognized as neither economically nor environmentally sustainable. This project is to document sustainable ("green") residential development case studies from across Canada so that developers, municipalities, housing professionals, and community groups can learn about success stories and replicate these "green" solutions, where applicable.

CMHC Project Officer : *Mark Holzman* **CIDN** : 29490200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

IMPACT OF DEVELOPMENT COST CHARGES ON HOUSING AFFORDABILITY

The objectives of this project are to: (i) investigate the impact of development cost charges on the price and affordability of housing in Canada; (ii) identify the costs and benefits of both infill and new subdivision developments in Vancouver, Calgary, Winnipeg, Toronto, Montreal and Halifax; and (iii) quantify the up-front and ongoing costs or benefits of infill and new subdivision development on the residents of the new development, residents of existing developments, the local government and the community at large.

CMHC Project Officer : *Fanis Grammenos* **CIDN** : 34060200
Division : Policy and Research Division **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

LIVEABLE LANES: OVERCOMING BARRIERS TO LANE WAY INFILL HOUSING IN B.C.'S GROWING COMMUNITIES

This study aims to identify and shed light on barriers to lane way infill housing in B.C.'s growing communities. It will develop strategies and recommendations for overcoming them and broaden interest in lane way infill housing among residents, builders and other housing sector stakeholders. A final report has been submitted and is being reviewed.

CMHC Project Officer : *Lynn Armstrong* **CIDN** : 34380209
Division : External Research Program **STATUS** : Ongoing
AVAILABILITY : Product is not yet available

MODELING AND ASSESSING LOWER RAINWATER RUN-OFF IN STRATFORD, ON

This research will investigate the relationship between storm water run-off reduction and approaches to street pattern design. The work will employ a new computerized model for estimating run-off, the Water Balance Model, that calculates run-off quantities based on the hydrological, site and development data. The outcome of this analysis will help inform municipalities and developers of opportunities for run-off reduction using suitable planning components and tools.

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 34120200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MUNICIPAL PLANNING POLICY FOR THE MITIGATION OF RESIDENTIAL ENCROACHMENT ACTIVITIES WITHIN THE EDGES OF URBAN FORESTS

This study evaluates the effectiveness of municipal policies in southern Ontario that seek to limit the encroachment activities of adjacent residents within municipal forests. It will also determine the type, intensity and real extent of the evidence of encroachment activities. A final report has been submitted and is under review.

CMHC Project Officer : *Lynn Armstrong* ***CIDN*** : N/A
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL DEVELOPMENT AROUND TRANSIT NODES

This project will result in 10 case studies of residential development around transit nodes across Canada. This will be done by interviewing the developers and municipal planners involved in the developments and surveying occupants. The aim is to provide developers, municipalities and housing professionals with insights into the successes of the developments and how challenges were or could be overcome, to help them in replicating and building on those solutions. The first five case studies have been finalized and are in the publication process. An additional four draft case studies have been received and are being reviewed.

CMHC Project Officer : *Lynn Armstrong* ***CIDN*** : N/A
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

STORMWATER MANAGEMENT CASE STUDIES

This project will examine 5 built case studies of green stormwater management innovations in residential developments in Canada. The study would examine the successes and lessons learned about those practices including their marketability and profitability, costs (particularly in comparison to standard practices), design and technical barriers and innovations, regulatory issues, occupant satisfaction, municipal involvement, liability issues, etc. The goal is to inform other developers of the successes and lessons learned from these innovative practices so they can replicate and build on those solutions. It will result in the publication of 5 case studies and a research highlight synthesizing the findings of the case studies.

CMHC Project Officer : *Lynn Armstrong* ***CIDN*** : 35250200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL DEVELOPMENT

TREE PRESERVATION IN RESIDENTIAL DEVELOPMENTS: CASE STUDIES

This project will examine 10 case studies of innovative residential developments where the developer preserved a significant number of existing trees. The study would examine the successes and lessons learned including marketability and profitability, costs, design and technical barriers and innovations, regulatory issues, occupant satisfaction, municipal involvement, liability issues, etc. The goal is to inform other developers of the successes and lessons learned from these innovative developments so they can replicate and build on those solutions.

CMHC Project Officer : *Lynn Armstrong*
CIDN : 35260200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SENIORS

ADAPTING BUNGALOWS FOR SENIORS' HOME CARE: A POST-OCCUPANCY EVALUATION

This research project consists of a post-occupancy evaluation of suburban bungalows that were redesigned for seniors receiving health care services at home. The study aims for the production of an illustrated report compiling typical life stories, combining the day-to-day experiences of participating seniors, the comments of the caregivers and the characteristics of the homes.

CMHC Project Officer : *Luis Rodriguez*
CIDN : 26470210
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

ADAPTING THE HOME ENVIRONMENT FOR ALZHEIMER'S AND RELATED DEMENTIA: COLLABORATIVE RESEARCH CREATING A SELF ASSESSMENT TOOL

The objective of this research is to develop a self-assessment tool that will function as a community resource to guide individuals experiencing Alzheimer's Disease and Related Dementia (ADRD) and their families through the process of adapting their home environment while reflecting their individual needs and concerns The research will be conducted in close collaboration with persons with ADRD and their caregivers.

CMHC Project Officer : *Luis Rodriguez*
CIDN : 28920214
Division : External Research Program
STATUS : Ongoing
AVAILABILITY : Product is not yet available

CARING FOR AGING PARENTS: SENIOR ADULTS LIVING WITH ADULT CHILDREN IN PRAIRIE CENSUS METROPOLITAN AREAS

This project's objective is to provide research findings to help the housing industry learn the degree of commitment that exists for this type of personal family care for older parents and assess the implications for the housing market of this form of housing demand.

CMHC Project Officer : *Brian Hollohan*
CIDN 23031000
Division : Market Analysis Centre
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DETERMINING THE IMPLICATIONS OF THE AGING OF THE CANADIAN POPULATION FOR HOUSING AND COMMUNITIES

The objective of this project is to examine the specific implications of the aging of the Canadian population for housing and communities. The research will be based on existing data and literature, new practical information from experts and key informants in communities, and case studies of communities that have already reached the proportions of seniors that Canada is expected to have over the next 30 years. The emphasis will be on identifying the challenges and opportunities for planning, designing and managing communities (i.e. cities, small towns and suburbs) with increasing older populations. While the project will deal with a range of issues, the main focus will be on urban form and housing. Other related issues, such as transportation, will have a secondary focus.

CMHC Project Officer : *Luis Rodriguez*
CIDN : 27420200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF CURRICULA AND SEMINAR MODULES FOR NEW AND EXPANDED CONSTITUENCIES

The objective of this project is to examine the information needs of new audiences for the Seniors Seminars, e.g.: municipalities, at staff and political levels; Aboriginal communities; provincial and territorial governments whose growing population of seniors merit attention to design and living arrangements for this segment, and; seniors themselves. It will develop a plan to produce curricula and training materials for new seminars. The project will include a feasibility study on delivery to the new audiences and identify strategies on marketing the seminars and securing delivery venues in partnership with these groups. This work will be coordinated with work in the project "Re-evaluation and Enhancement of Existing Senior Seminar Modules".

CMHC Project Officer : *Jim Zamprelli*
CIDN : 30370200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF TRAINING MODULES AND CURRICULUM ON HOUSING FOR SENIORS AND PEOPLE WITH DISABILITIES FOR THE ARCHITECTURAL PROFESSION AND EDUCATION INSTITUTIONS WITH CONSTRUCTION-RELATED PROGRAMS

The objective of this project was to identify the most effective techniques for the development and delivery of seminars on seniors' housing for architects, architectural technologists, and other building and design professionals. The actual results/outputs of the project were learning and training materials, as follows: 1. A Module on Residential Adaptations for Independent Living - a PowerPoint presentation, case study, proficiency exercises, a Facilitator's Guide and a Student Guide; 2. A Module on Designing for Dementia - a PowerPoint presentation, a Facilitator's Guide and a Student Guide; also 3. A case study and proficiency exercises were developed as interactive materials to be used in a web environment. Material will be available on the CMHC web site, www.cmhc.ca, in due course.

CMHC Project Officer : *Jim Zamprelli*
CIDN : 26780200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Seminar/training is available

EXAMINATION OF LIFE LEASE HOUSING ISSUES: FINAL REPORT

A life lease is a legal agreement that permits purchasers to occupy a home for life in exchange for an initial lump sum payment and subsequent monthly payments to cover the ongoing project management fees and maintenance and operating expenses. Because this is a new form of tenure, there exist consumer protection issues related to life lease housing. The purpose of this study is to provide target audiences, including prospective residents, sponsors, development consultants, lenders, researchers and provincial, territorial and municipal governments, with the information they need to better understand and respond to a number of issues related to life lease housing. Manitoba is the only province with specific legislation.

Prepared by GGA Management Consultants. CMHC Project Manager: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2007. 70 pages (668 KB)

Note: No. 07-006 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order number 65427).

STATUS : Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Life%20lease%20housing%20issues%20-%20Final%20report%20March_07_W.pdf

GOVERNANCE OF SOCIAL HOUSING FOR SENIORS: A COMPARATIVE ANALYSIS

The primary objective of this research is to compare the governance of housing for seniors in Quebec, Ontario and Denmark and, in particular, the linkage between housing and home support services. The assumption is that certain types of governance promote a better linkage between home support and housing, but that the players are also important in this linkage. The goal is to find out which structures and which initiatives seem better.

CMHC Project Officer **:** *Luis Rodriguez*

CIDN : 28920206

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

HOUSING OPTIONS STUDY FOR OLDER ADULTS IN THE REGION OF PEEL

The purpose of the research project is to gather data on housing preferences and needs of older adults in the Region of Peel aged 55 years and older. There are three main goals of the research project:

1) To develop, distribute and analyze responses to a survey that captures the key areas of information required;

2) To facilitate focus groups to obtain required housing needs and preference information;

3) To develop an appropriate approach to obtain required housing needs and preference information from older adults who are identified as being isolated.

CMHC Project Officer **:** *Brett C Barnes*

CIDN : 30390200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

PILOT IMPLEMENTATION AND DELIVERY OF REVISED SENIORS SEMINARS TO NEW AND EXPANDED AUDIENCES

This project flows from the key main objectives originally established for the Seniors Seminars project, i.e.

a) To increase awareness of CMHC as the Federal government's housing agency and as a major source in Canada of research and knowledge on seniors' housing issues;

b) To increase awareness in the community of the range and type of seniors' housing options that can be made available;

c) To heighten knowledge and take up of CMHC Assisted Housing Programs targeted to seniors and persons with disability (RRAP-D, HASI, Canadian Centre for Public-Private Partnerships in Housing).

The methodologies for meeting project objectives will be:

a- arranging pilot seminar venues and partnership agreements with host organizations

b- promoting the pilot seminars, marketing to key client groups

c- locating and engaging seminar presenters and animators, who will be both external contractors and CMHC personnel.

CMHC Project Officer : *Jim Zamprelli* ***CIDN*** : 30380200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PROBABLE EFFECTS OF AN AGING POPULATION ON THE HOUSING MARKET: A PROSPECTIVE STUDY

In the coming decades, Quebec will be confronted by an aging population. Though the impacts on employment seem obvious and well documented, the same cannot be said, unfortunately, for the housing field, even though the consequences will be just as important. This research will follow the path baby boomers have been taking since 1965 and will attempt to identify the main upheavals that will affect the housing market from now until 2050.

CMHC Project Officer : *Luis Rodriguez* ***CIDN*** : 36260206
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

PROJECTING THE HOUSING NEEDS OF AGING ATLANTIC CANADIANS

This research will examine the current housing and support service needs of Atlantic seniors at both the provincial and regional levels. The research team is being led by Mount Saint Vincent University with the collective efforts of a research alliance of 37 members encompassing all four Atlantic Provinces, and representing universities, seniors organizations, housing developers, service providers, and government departments. Funding has been provided by the Social Sciences and Humanities Research Council through the Community-University Research Alliance Program. Funding contributions have also been made by Canada Mortgage and Housing Corporation, the Nova Scotia Department of Community Services, Mount Saint Vincent University, Dalhousie University, University of New Brunswick and the University of Prince Edward Island.

CMHC Project Officer : Luis Rodriguez ***CIDN*** : 29520200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RE-EVALUATION AND ENHANCEMENT OF EXISTING SENIOR SEMINAR MODULES

This project is intended to :

a- follow-up and action the evaluative comments and suggestions for enhancement to modules provided by seminar participants, by the team of presenters during the post-pilot phase debriefings and the retrospective observations made by the project consultant who provided feedback through the workshop evaluations done at most sessions;

b- integrate CMHC research results into the modules to make them more useful to expanded client groups, especially those with more technical educational needs;

c- undertake objectives (a) and (b) in light of the findings, conclusions and recommendations expected to result from the project on consulting new and expanded constituencies.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30360200
STATUS : Ongoing

REGULATING SUPPORTIVE HOUSING FOR SENIORS: A COMPREHENSIVE STATUTE MODEL

Provinces across Canada are currently addressing the need to develop supportive housing for seniors and, as a necessary corollary to that need, development of a regulatory framework. Effective regulation in this sector must protect the rights and interests of residents without replicating the maximum legislated standards that apply to care facilities or nursing homes. The appropriate balance is difficult to achieve. Previous research carried out by the applicant researcher indicated that a comprehensive statute provided the most workable model for regulation in this area. The proposed project would build on that work to create a model comprehensive statute that would include provisions affecting the necessary balance. The model statute and accompanying report would serve as a useful tool for policy makers working in this area.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 36260207
STATUS : Ongoing
NEW

SEMINARS ON SENIORS' HOUSING FOR THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors housing for professionals in the Canadian residential and home care sectors. The project was developed to disseminate the results of CMHC's research, programs and other relevant information concerning seniors housing.

This project entails eight separate modules on different aspects of seniors housing. By year-end 2005 some 4 dozen seminars/presentations were delivered at over 30 events. Evaluation results indicate a very high degree of satisfaction with the seminars and participants indicated they have used or plan to use the information gained at these events. The seminars project is ongoing, with a focus on the health and home care industry, architects and home builders.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Seminar/training is available
CIDN : 23820200
STATUS : Ongoing

SENIORS

SUPPORTIVE HOUSING FOR HOMELESS AND HARD-TO-HOUSE SENIORS: AN IN-DEPTH CASE STUDY OF FAIRWAY WOODS: FINAL REPORT

This document is an in-depth case study of Fairway Woods, a supportive housing project for formerly homeless or hard-to-house seniors. It is located in Langford, near Victoria, BC. Research methods included a review of documents, records and floor plans; one-to-one interviews, walk-and-talk interviews and group interviews; a quality of life survey of tenants; participant observation and photographs. This report includes detailed information about: the location, site, building, dwelling units, tenants, services, service providers, and development of Fairway Woods; an evaluation of the built environment; illustrations of the impact of moving to Fairway Woods on tenants' lives; and numerous lessons learned by the housing sponsor and service providers. It concludes with recommendations from study informants, addressed to people who work in the fields of homelessness, supportive housing, mental health, community-based support services, architecture and building.

Prepared by Nancy Gnaedinger. CMHC Project Managers: Anna Lenk and Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2007. (External Research Program Research Report) ca 153 pages (4068 KB)

Note: No. 07-017 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 65672)

STATUS : New Completed Report and Research Highlight

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Housing_Homeless_HH_Seniors(w).pdf

See also: MAXIMIZING ENERGY EFFICIENCIES IN A MULTI-UNIT RESIDENTIAL BUILDING, p. 57

SOCIAL HOUSING

CRESCENT VALLEY: A COMMUNITY IN MOTION: REPORT TO CANADA MORTGAGE AND HOUSING CORPORATION, SAINT JOHN, NB.

The objective of this project was to undertake a face-to-face survey interview of residents of the Crescent Valley Housing Program in Saint John, NB, using a tool developed specifically for the neighbourhood and with resident input. Crescent Valley is a 388-unit public housing project located in Saint John, New Brunswick. The housing project, owned by the Province of New Brunswick and managed by the Department of Family and Community Services, was constructed in the late 1950s.

Submitted by Gail Taylor, Community Coach and Colleen Grattan Gick, Project Manager, Vibrant Communities Saint John. Ottawa: Canada Mortgage and Housing Corporation, 2006. 10 pages

STATUS : Completed Report

AVAILABILITY : On a loan basis from Canadian Housing Information Centre

EVALUATING SOCIAL HOUSING AS A HEALTH INTERVENTION IN THE GTA WEST AREA

This study will provide evidence-based knowledge of the impacts of improved housing conditions on the health status of low-income Canadians in order to support more informed discussion and decisions concerning the contribution that housing programs make to improving the health of vulnerable populations. It will gather data from persons initially on the waiting lists of housing authorities in an area west of Toronto.

CMHC Project Officer : *Ian Melzer*

CIDN : 35330200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SOCIAL HOUSING

REGENT PARK LONGITUDINAL HEALTH STUDY

This study will investigate the effects of the Regent Park Social Housing Revitalization Project - Phase I Redevelopment on the health and well-being of residents, and how interventions in the built environment may reduce health inequalities and improve the lives of low-income, urban populations, using a quasi-experimental research design. The redevelopment plan seeks to: a) create social mix; b) promote positive social interaction (using innovative architectural and urban designs); and c) create affordable home ownership for a subset of residents.

CMHC Project Officer : *Mark Salerno*	***CIDN*** : 34470200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

REGENT PARK REVITALIZATION: YOUNG PEOPLE'S EXPERIENCE OF RELOCATION FROM PUBLIC HOUSING REDEVELOPMENT

This External Research Program project will assess the social impacts of relocation of residents — particularly young people aged 12-17 years — during redevelopment of their public housing community. Toronto Community Housing Corporation (TCHC) recently began phased redevelopment of Regent Park, Canada's oldest and largest public housing project.

CMHC Project Officer : *Cynthia Rattle*	***CIDN*** : 36260209
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

CONTINUING EDUCATION ARTICLES FOR PLANNERS

These CMHC web-based Continuous Professional Learning articles will provide up-to-date and in-depth knowledge to professional planners on leading edge research issues. Two topics are the subject of this project: Brownfield Regeneration and Growth Management. The first examines Brownfields as an opportunity to relieve pressure for city expansion while the second looks at growth as an opportunity to apply techniques that will reduce its environmental impact.

CMHC Project Officer : *Fanis Grammenos*	***CIDN*** : 34500200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

CRITERIA AND METHOD FOR EVALUATING SUBDIVISION PLANS FOR LIVABILITY AND SUSTAINABILITY

Many observers have noted that we have much talk about urban sustainability in Canada, but few examples of sustainable development exist on the ground. The reasons for this are complex, but one reason that is often put forward is that we lack a system of criteria to define what a sustainable project would look like, how it would function, and what impacts it would have on key parameters. This limits the ability of sustainability advocates in the community, on council, municipal staff or within the development industry to articulate an alternative to existing development practices and designs or to objectively evaluate proposals being put forward under the rubric of sustainability.

This study serves as the first phase of a larger project that is intended to create a sustainable subdivision evaluation system (SSES). Such a system would provide a method or model that planning practitioners, developers and other stakeholders in communities across Canada could use to assess subdivision plans for their livability and sustainability features. The current report is focused on describing the state of the art in evaluating subdivision plans from a livability and sustainability perspective and making recommendations for proceeding with the next stages of the overall project.

Prepared by Ray Tomalty (Co-operative Research and Policy Services), Diana Butler (Urban Aspects Consulting Group Ltd.), and David Bruce (Mount Allison University) with the assistance of Blaire Chisholm (Co-operative Research and Policy Services). CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2006. 182 pages (1161 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_Criteria_Method_w.pdf

FAMILIES LIVING DOWNTOWN: CHALLENGES AND BENEFITS

This External Research Program study will examine the housing-related experiences of families who are choosing to live in or near downtown areas. It will examine the reasons for their choice, how they are managing their urban life with their children, and the challenges and benefits they experience once they have lived there for some time. These experiences will be related to key objective measures of their own residence and their downtown neighbourhood. This research will complement previous views on how to plan central areas for families by studying the experiences of downtown family residents, those who actually "live their life" there.

CMHC Project Officer *: Fanis Grammenos*

CIDN : 34380210

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

REDUCING THE PLANNING APPROVALS PROCESS THROUGH ENHANCED SUSTAINABILITY: DOCKSIDE GREEN CASE STUDY

This project will examine the success of the Dockside Green development in Victoria, BC, in reducing the anticipated planning approvals process from over three years to under one year. By incorporating sustainable development features, the project generated tremendous community support that resulted in no opposition during the planning approvals process, saving significant time and money for both the developer and the municipality. The project will document the process, other future approvals that may be required, and the verification process used by the City to ensure the sustainable features were incorporated as promised. The research will also examine the developer's motives behind incorporating specific features, the lessons from their experience, and any changes in the City's position on sustainable community planning.

CMHC Project Officer *: Lance Jakubec*

CIDN : 35240200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SITE CONTROL FOR SUSTAINABLE COMMUNITY DEVELOPMENT: FINAL REPORT

Communities are increasingly turning to sustainable development frameworks as a means of integrating planning priorities, improving public participation, leveraging resources, and as a way of generating creative and practical solutions to shared economic, environmental and social problems (Roseland, 2005). Much of the research and practice related to sustainable community development has focused on incorporating sustainability principles into existing planning processes. However, there remains a significant gap between sustainable community development planning and implementation. Local land use decisions and real estate development is one area that is of critical importance to communities and provides a tangible example of this gap, suggesting that new thinking is required about the land development process, the role of site control and it's relationship to sustainable community development.

This paper investigates case studies in Nelson and Victoria, BC where site control and ownership played a significant role in ensuring that land use and development outcomes were aligned with the community's vision for the site and were supportive of sustainability principles. The results of this research suggest while improvements to the land use planning process are important, site control actors are required that can play a proactive role in land use development to promote and demonstrate the tangible benefits of sustainable community development.

Prepared by Simon Fraser University, Centre for Sustainable Community Development. Mark Roseland, Principal Investigator; Sean Connelly, Senior Researcher; Chris Lindberg, Researcher; and David Hendrickson, Researcher. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 2006. (External Research Program Report) 44 pages (883 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/SiteControl_WEB.pdf

SUSTAINABILITY INDICATORS FOR COMPUTER-BASED TOOLS IN COMMUNITY DESIGN

This External Research Project will evaluate sustainability indicators for potential integration with widely used geographic information system based modelling and visualization tools. It will refine the content and method of the indicators most suitable for such integration, propose new indicators where necessary, test refined and proposed indicators in a case study project and evaluate the results for broad application.

CMHC Project Officer *: Douglas B Pollard*

CIDN : 34380211

Division : External Research Program

STATUS : Ongoing

AVAILABILITY : Product is not yet available

SUSTAINABLE COMMUNITY PLANNING AND DESIGN CHARRETTE SUPPORT AND PARTICIPATION

This project will continue to contribute to sustainable community design charrettes by providing financial and event planning assistance and/or direct CMHC staff participation and publication of results for certain selected charrettes. A charrette was held in Fort McMurray Alta. and Perth Ontario. There will be another in Winnipeg and other potential charrettes have been identified and are being pursued.

CMHC Project Officer *: Douglas B Pollard*

CIDN : 34110200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

NEW

UNDERSTANDING THE SMART GROWTH GAP

This project will investigate the reasons for the gap between stated municipal policy objectives, which align with the goals of Smart Growth, and the results on the ground. It will aim to answer the following questions:

- What prevents the accomplishment of set goals?
- Are the goals inherently unachievable?
- What are the expected impacts of Smart Growth practices under a normal positive scenario?
- What time lines can be speculated or calculated for prescribed outcomes?
- What strategies are deemed most effective with respect to the level of impact?

The intent of this research is to enable local governments and industry to lay out a strategy that will produce sustained positive outcomes with predictable beneficial effects for the environment and for the well-being of community residents.

CMHC Project Officer : *Fanis Grammenos*
CIDN : 35230200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

USER PILOTING OF THE INFRASTRUCTURE COSTING MECHANISM

This project will consist of internal and external workshop sessions where tool development experts will work with selected community stakeholders to validate and refine the current "beta" version of the costing mechanism to facilitate sustainable community planning. These sessions will assess the accuracy and usability of this tool prior to its final release by CMHC. The sessions will allow individuals from CMHC Research as well as a range of Canadian regions and municipalities to test this new tool on known situations as well as their own planning scenarios and to compare results.

CMHC Project Officer : *Douglas B Pollard*
CIDN : 32670200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available
NEW

WEST HILLS SUBDIVISION SUSTAINABLE DESIGN CHARRETTE, FREDERICTION, NEW BRUNSWICK 2004

A 2.5 day charrette was held in Fredericton to develop practical and realistic options for integrating sustainable development strategies into the design of the proposed West Hills subdivision. The charrette provides an example of a developer leading the way to a more environmentally sustainable development that would be appealing to the public and provided the developer with new ideas for the design of the subdivision.

Prepared by Jacques Whitford Limited. CMHC Project Officer: Cynthia Rattle. Ottawa: Canada Mortgage and Housing Corporation, 2005. 37 pages (1510 KB)

Note: No. 07-004 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site (Order no. 65424)

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/West_Hill_Charrette(W).pdf

See also: Technical Research on Sustainable Development & Healthy Housing, p. 54-61

ASSESSING TRAVEL AND ENVIRONMENTAL ASPECTS OF THE FUSED GRID

This research project will investigate the relationship between street network type and travel behaviour with a focus on testing the performance, using empirical measures of micro-scale street environment and travel survey data, of the 'Fused Grid' street network design. Of particular interest is whether street networks that approximate the Fused Grid (high connectivity for non-motorized modes with disconnected routing for motor vehicles) actually result in greater non-motorized mode share and reduced motor vehicle use when compared to other street network types. The results will provide information to guide revisions to street standards for new residential developments and will have implications for the retrofit of existing street networks.

CMHC Project Officer : *Fanis Grammenos* — ***CIDN*** : 28920205

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

ASSISTING MUNICIPALITIES AND DEVELOPERS TO EVALUATE AND APPLY THE FUSED GRID CONCEPT: PART 1 - A TRAFFIC ANALYSIS STUDY

This study compared the traffic performance of three different neighbourhood layouts including district and regional streets in a real setting. It assessed the relative merits of various road network and land-use approaches, including the conventional suburban development (featuring loops and cul-de-sacs); the traditional neighbourhood development or TND (featuring the traditional city grid); and a Fused-Grid layout, which combines elements of the traditional grid with those of conventional suburban layouts. The analysis shows that: a) the Fused Grid layout exhibits the best traffic performance, particularly with increased density of development; b) a hierarchical network layout can improve traffic performance; c) one-way couplets improve traffic flow on arterials; d) the Fused Grid reduces traffic volumes on lower classification streets. Other findings suggest that a new approach to street network planning such as the Fused Grid can improve the efficiency of the network, lower road infrastructure costs and improve the quality of life of the residents. A final report has been received.

CMHC Project Officer : *Fanis Grammenos* — ***CIDN*** : 34160200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

YOUTH SHELTER PILOT SURVEY: FEASIBILITY & SELECTED FINDINGS REPORT

In 2006, Canada Mortgage and Housing Corporation (CMHC) funded a pilot survey of youth shelters in Canada conducted by the Canadian Centre for Justice Statistics (CCJS) at Statistics Canada.

Since 1999, CMHC has provided funding to youth shelters through its Shelter Enhancement Program (SEP) that also funds shelters for women and their children. CMHC evaluated its program in 2002, including a total of 15 youth shelters that had been funded up until that time. However, lack of quantitative information about the universe of youth shelters in Canada and youth homelessness generally, makes it difficult to assess the impacts of programs like SEP.

The objectives of the Youth Shelter Pilot Survey (YSPS) were to test methods for collecting facility and client information from youth shelters, and to assess the feasibility of a national youth shelter survey.

Prepared by Andrea Taylor-Butts, Canadian Centre for Justice Statistics, Statistics Canada. CMHC Project Officer: Ed Nera. Ottawa: Canada Mortgage and Housing Corporation, 2007. 56 pages (2618 KB)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Youth_Shelter(web)_july_12.pdf

CMHC RESEARCH REPORT LISTINGS

To provide quick and comprehensive access to CMHC research published on a given topic, the Canadian Housing Information Centre compiles comprehensive listings of housing research produced over a number of years on certain topics. Topics chosen are those for which there is ongoing client interest and/or for which CMHC has published considerable research. To obtain an electronic, faxed or mailed copy of any of the lists below, contact the Canadian Housing Information Centre at: 1-800-668-2642 or e-mail us at: chic@cmhc.gc.ca

Listings available at this time include:

- Aboriginal Housing
- Acoustics
- Affordable Housing
- Airtightness
- Basements, Foundations and Crawl Spaces
- Concrete
- Condominiums
- Cooperative Housing
- Environmental Site Assement and Contaminated Lands
- Healthy Housing
- Heating and Ventilation
- Homelessness
- Housing and Women
- Housing Export Opportunities
- Housing for Older Canadians
- Housing for Persons with Disabilities
- Indoor Air Pollution
- Infrastructure
- Lead
- Log Home Construction
- Manufactured Housing
- Moisture Problems
- Mortgages and Housing Finance
- Newcomers, Immigration & Settlement
- Northern Housing
- Rental Housing
- Residential Construction Waste
- Residential Renovation
- Self Help Housing
- Social Housing
- Straw Bale Housing
- Sustainable Development
- Water Conservation, Reuse and Management

ABOUT YOUR HOUSE SERIES

Fact sheets on common housing questions, issues and problems.

These documents are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at: http://www.cmhc.ca/en/co/co_001.cfm

Print copies can be obained by calling 1-800-668-2642

Order no.	Series no.	Title
62027	CE 1	**Measuring Humidity in Your Home** Is there condensation on the windows? Are there wet stains on the walls or ceilings? Is there static or sparks whenever you touch something? Diagnose humidity problems in your home. Aussi disponible en français sous le titre : Mesurer l'humidité dans votre maison
62028	CE 2	**Combustion Gases in Your Home** Do you have a gas or oil fired furnace, boiler or water heater? What about a woodstove or fireplace? Take the necessary steps to keep combustion gases out of your home. Aussi disponible en français sous le titre : Les gaz de combustion dans votre maison
62029	CE 3	**Asbestos** What is asbestos? Why is it so useful? What problems can asbestos cause and what options does the homeowner have in dealing with them? Aussi disponible en français sous le titre : Amiante
62030	CE 4	**Hydronic Radiant Floor Heating** Heating option for homes. Tubes are placed in concrete floor with water running through. Popular in bathrooms and kitchen, and can be done for entire house - new or existing. Aussi disponible en français sous le titre : Système de chauffage à eau chaude par rayonnement à partir du sol
62031	CE 5A	**Understanding Window Terminology** This factsheet offers helpful guidance on buying the right type of window for your home. Terminology commonly used in the window industry is also presented. Aussi disponible en français sous le titre : Comprendre la terminologie des fenêtres
62032	CE 6	**Urea-Formaldehyde Foam Insulation (UFFI)** What is UFFI? Why was it banned? Should you be concerned about UFFI? How do you know if your home has UFFI? Aussi disponible en français sous le titre : Mousse isolante d'urée-formaldéhyde (MIUF)

Order no.	Series no.	Title
60515	CE 7	**After the Flood** Protect your health and prevent further damage to your home by following this step-by-step guide to restoring your home after a flood. Aussi disponible en français sous le titre : Après une inondation
60516	CE 8	**Fighting Mold: The Homeowner's Guide** Mold can cause allergies or respiratory disease. Learn how to identify and eliminate mold from your home. Aussi disponible en français sous le titre : Combattre la moisissure -- Guide pour les propriétaires-occupants
62043	CE 9	**Maintaining Your HRV** For a clean and healthy living environment, review the seven steps to maintaining the Heat Recovery Ventilator (HRV). Aussi disponible en français sous le titre : L'entretien du VRC
60339	CE 10	**Wood Heat Safety in an Emergency** Whether you often use a wood stove or a fireplace, or are coping with an emergency loss of electricity, learn how to safely use wood to heat your home. Aussi disponible en français sous le titre : Le chauffage au bois en toute sécurité lors d'une situation d'urgence
60356	CE 11	**When You Must Leave Your House Due to Prolonged Winter Power Outage** A series of practical tips to protect your home in case you are required to evacuate for more than 24 hours because of power failure. Aussi disponible en français sous le titre : Si vous devez quitter votre maison à cause d'une longue interruption de courant en hiver
60360	CE 12	**Helping Your Trees Survive Storm Damage** Practical pruning advice to restore the health and shape of trees damaged by ice or wind storms. Aussi disponible en français sous le titre : Soins à donner aux arbres endommagés par une tempête
62034	CE 13	**Attic Venting, Attic Moisture, and Ice Dams** How do you deal with a leak in the ceiling? How should an attic be properly vented? How do you eliminate ice dams? This fact sheet will answer these and other attic related questions. Aussi disponible en français sous le titre : Ventilation du vide sous toit, humidité dans le vide sous toit et formation de barrières de glace

Order no.	Series no.	Title
62035	CE 14	**Soot Staining on Carpets** Does your carpet have permanent dark stains near baseboards, air registers or under doorways? Find out what causes carpet streaking and what you can do about it. Aussi disponible en français sous le titre : Taches en traînée sur les moquettes
62036	CE 15	**Removing Ice on Roofs** Whether you have a sloped or flat roof, learn techniques that will help you deal with extensive roof icing or ice dam problems. Aussi disponible en français sous le titre : L'enlèvement de la glace sur les toitures
62037	CE 17	**The Importance of Bathroom and Kitchen Fans** Choosing the proper kitchen and bathroom fans is important for improving indoor air quality and maintaining ideal humidity levels. Aussi disponible en français sous le titre : Importance des ventilateurs de cuisine et de salle de bains
62038	CE 18	**How to Read a Material Safety Data Sheet (MSDS)** Reading and understanding the Material Safety Data Sheet (MSDS) provides product information about product hazards and the necessary safety precautions to follow when using it. Aussi disponible en français sous le titre : Comment déchiffrer une fiche technique sur la sécurité des substances (FTSS)
62039	CE 19	**Insulating Your House** Choose the right insulation to reduce the amount of energy you use and to make your home more comfortable. Aussi disponible en français sous le titre : L'isolation de votre maison
62040	CE 21	**Log Homes: Frequently Asked Questions** A list of questions and answers concerning the unique design and building considerations for log homes. Aussi disponible en français sous le titre : Foire aux questions - maisons en rondins
62041	CE 22	**Your Furnace Filter** To reduce exposure to airborne particles, choose the furnace filter that best suits your needs. Aussi disponible en français sous le titre : Le filtre de votre générateur d'air chaud

Order no.	Series no.	Title
62042	CE 23	**Water-Saving Tips for Your Lawn and Garden** Often water is applied inefficiently, resulting in significant waste due to over watering, evaporation or run-off. Here are some general watering tips to avoid such waste. Aussi disponible en français sous le titre : Comment entretenir vos pelouses et jardins en économisant l'eau
60417	CE 24	**Backup Power for Your Home** The top ten tips in choosing the appropriate backup system to provide electricity to your home in the event of a prolonged power failure. Aussi disponible en français sous le titre : Alimentation de secours pour votre maison
62046	CE 25	**Carbon Monoxyde** A list of questions and answers dealing with keeping Carbon Monoxide out of your home and to help you choose the right CO detector. Aussi disponible en français sous le titre : Le monoxyde de carbone
62277	CE 26a	**Hiring a Contractor** How do you find the "right" contractor for you? What should go in a contract? What are liens, holdbacks and completion certificates? Make sure you get what you want and pay for when hiring a contractor. Aussi disponible en français sous le titre : Le Choix d'un entrepreneur
62351	CE 26b	**Sample Renovation Contract** A detailed written contract between you and the contractor you hire is essential to any renovation or home repair project, no matter its size. Aussi disponible en français sous le titre : Modèle de contrat de rénovation
62045	CE 27	**Choosing a Dehumidifier** Air that is too damp can cause condensation on windows, water damage to materials, mold and even wood rot. Choose the right dehumidifier to regulate the humidity in your home. Aussi disponible en français sous le titre : Le Choix d'un déshumidificateur
	CE 28	**The Renovation Project (12 parts)**
		This series will assist you in making informed decisions before you renovate. Each easy-to-read fact sheet helps you ask the key questions, reviews the available options and discusses the consequences if certain aspects of the renovation are overlooked. Advance planning is the key to successful renovations. These fact sheets help you plan, assess, and avoid surprises. Achieve the results you want by doing your renovation right the first time.

Order no.	Series no.	Title
62246	CE 28a	**Assessing the Renovation Project** Before renovating, it's important to assess your home's current condition to determine if there are significant problems that you must deal with before or during the renovation project. Aussi disponible en français sous le titre : Évaluation des travaux de rénovation
62248	CE 28b	**Renovating your Basement - Structural Issues and Soil Conditions** Renovating a basement can add value and extra living space to a home. Fixing foundation problems before renovating is essential to preserve the durability and structure of the house. Aussi disponible en français sous le titre : Rénovation du sous-sol - Aspects structuraux et conditions du sol
62250	CE 28c	**Renovating Your Basement - Moisture Problems** Is there condensation on the basement windows? Are there white chalky stains on the foundation? Do the carpets smell musty? Creating a clean, dry and healthy living space is a critical first step. Aussi disponible en français sous le titre : Avant de rénover votre sous-sol - Problèmes d'humidité
62252	CE 28d	**Renovating Your Kitchen** The kitchen is often the most used room in the house and kitchen renovations typically have the highest financial payback. Conduct a pre-renovation inspection and prioritize the most desirable features for your new kitchen. Aussi disponible en français sous le titre : Avant de rénover votre cuisine
62254	CE 28e	**Renovating Your Bathroom** Bathroom renovations offer the second highest financial payback rate and are one of the most common home improvement projects. Use this fact sheet to check for problems before you renovate. Aussi disponible en français sous le titre : Rénovation de la salle de bains
62256	CE 28f	**Window and Door Renovations** Do you want more natural light in your living area? Are you concerned about security? Before repairing or replacing windows and doors, consider all of the factors outlined in this fact sheet. Aussi disponible en français sous le titre : Nouvelles portes et fenêtres

Order no.	Series no.	Title
62258	CE 28g	**Repairing or Replacing Roof Finishes** Regular maintenance and periodic roof inspections will identify problems before they cause costly damage to your home. Learn about the key factors that will determine whether you should repair or replace your roof. Aussi disponible en français sous le titre : Avant de réparer ou remplacer le revêtement du toit
62260	CE 28h	**Repairing and Replacing Materials - Exterior Walls** Exterior finish materials must prevent rain and snow from penetrating the building and causing moisture damage. Repairing or replacing exterior wall finishes will protect and preserve the durability and structure of the home. Aussi disponible en français sous le titre : Avant de réparer ou remplacer des matériaux - les murs extérieurs
62262	CE 28i	**Energy Efficient Retrofit - Mechanical Systems** Upgrading the heating, cooling and ventilation (HVAC) equipment is the best way to create a healthy, comfortable and less expensive home to operate. Before altering these, it is important to understand how the overall performance of the house will be affected. Aussi disponible en français sous le titre : Avant d'améliorer l'efficacité énergétique de votre maison - installations mécaniques
62264	CE 28j	**Energy Efficient Retrofit - The Building Envelope** The envelope, or outer layer, of your house separates living space from the outdoor elements. Improving it can result in a better insulated, more airtight home that is easier to heat. Aussi disponible en français sous le titre : Améliorer l'efficacité énergétique - L'enveloppe du bâtiment
62266	CE 28k	**Assessing the Comfort and Safety of Mechanical Systems** The heating, ventilating and air conditioning (HVAC) systems are a vital part of your home. Ensure that your mechanical systems are operating safely and efficiently. Aussi disponible en français sous le titre : Évaluation de vos installations mécaniques - confort et sécurité
62268	CE 28L	**A New Addition** Before building an addition, clearly identify the features you need and inspect the current structure and mechanical systems to be sure they can support the new addition. Aussi disponible en français sous le titre : Avant de construire une annexe

Order no.	Series no.	Title
62044	CE 29	**Should you get your Heating Ducts Cleaned?** Should you get your heating ducts cleaned? Will clean ducts result in improved air quality? When is duct cleaning most appropriate? This fact sheet separates fact from fiction. Aussi disponible en français sous le titre : Doit-on faire nettoyer les conduits de chauffage?
63322	CE 30	**Water Damage, Mold and House Insurance** You've had water damage in your house due to a burst pipe, a roof leak, or a heavy summer storm. You hope that your insurance will cover the damage. What to do? Aussi disponible en français sous le titre : Moisissure, dommages causés par l'eau et assurance habitation
62226	CE 31	**Understanding and Dealing with Interactions Between Trees, Sensitive Clay Soils and Foundations** Is the size, type or siting of a tree affecting your foundation? Understanding the interactions between trees, soils and the foundation can help you avoid foundation shifting, cracks and other damage. Aussi disponible en français sous le titre : Comprendre l'interaction des arbres, du sol d'argile sensible et des fondations et agir en conséquence
65329	CE 32	**Setback Thermostats** There are many claims about the energy savings due to setback thermostats. This document quantifies the savings but also describes houses or conditions where setback thermostats are not recommended. Aussi disponible en français sous le titre : Les thermostats programmables
62288	CE 33	**CMHC Garbage Bag Airflow Test** This simple test uses an ordinary garbage bag to help you estimate airflow from your furnace registers, bathroom exhaust fan or clothes dryer exhaust. Aussi disponible en français sous le titre : Essai de mesure du débit d'air à l'aide d'un sac à ordures
62795	CE 34	**Your Septic System** A primer on the components, operation and proper maintenance of an in-ground septic tank and system. Aussi disponible en français sous le titre : Votre installation d'assainissement
62839	CE 35	**Hiring a Home Inspector** One of the best ways to understand about a home's condition, habitability and safety is to hire a professional home inspector. Aussi disponible en français sous le titre : Le Choix d'un inspecteur en bâtiment

Order no.	Series no.	Title
62341	CE 36	**The Condominium Owners' Guide to Mold** Special advice for identifying and removing mold in a condo, and solving the problems that cause it. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des copropriétaires
63902	CE 37	**The Tenant's Guide to Mold** This guide provides tenants of apartment buildings or rental houses with information to understand why mold grows and what they can do if they find mold growing in their unit. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des locataires
64066	CE 38	**How to Reduce Chemical Contaminants in Your Home** This guide focuses on reducing exposure to chemical contaminants in the home, and will help you identify and avoid household products and materials which are sources of chemical contaminants. Aussi disponible en français sous le titre : Réduire les contaminants chimiques dans votre maison
62935	CE 39	**Buying a Toilet** Advice and tips on what to look for when buying a toilet. Aussi disponible en français sous le titre : L'achat de toilettes
63319	CE 40	**Buying a House with a Well and Septic System** Information on what to inspect and test if a property has a well and/or septic system. Includes checklists for potential buyers. Aussi disponible en français sous le titre : L'achat d'une maison avec un puits et une installation septique
62953	CE 41A	**UV Water Treatment** Describes the ultra-violet light water treatment process, and the pros and cons of using such a system. Aussi disponible en français sous le titre : Traitement de l'eau aux rayons ultraviolets (UV)
62898	CE 41B	**Water Distillers** Everything you ever wanted to know about water distillers from how they work to how to install and maintain them. Aussi disponible en français sous le titre : La distillation de l'eau

Order no.	Series no.	Title
62896	CE41C	**Water Filters** Consumer series of household water treatment options. Water filters are an inexpensive method of additional water treatment. Some filters can remove certain contaminants such as lead. Aussi disponible en français sous le titre : Filtres à eau
62946	CE 41D	**Water Softeners** Find out how a water softener works and obtain information on whether you should consider installing one. Aussi disponible en français sous le titre : Les adoucisseurs d'eau
62962	CE 41E	**Reverse Osmosis Water Treatment** Describes the reverse osmosis water treatment process, and provides the pros and cons of using such a system. Aussi disponible en français sous le titre : Filtration de l'eau par osmose inverse
62966	CE 42	**Canada's Construction System** The purpose of this document is to foster understanding of the elements of the system of construction and operation of buildings and houses in Canada. Aussi disponible en français sous le titre : Système de construction canadien
63890	CE 43	**Photovoltaics (PVs)** Consumer information piece presenting information on solar electric (photovoltaic) systems for housing Aussi disponible en français sous le titre : Les systèmes photovoltaïques
63134	CE 44	**Painting: Walls, Ceilings and Floors** This fact sheet provides general information on: selecting paints, e.g. latex (water based) or alkyd (oil based); types of paint and paint finishes, e.g. low or high sheen, sealer, primer, melamine; estimating quantity of paint required; preparing for painting; and painting tips. Aussi disponible en français sous le titre : La peinture : murs, plafonds et planchers.
63144	CE 45	**Flooring Choices** A quick summary of the advantages, considerations, installation, maintenance, and costs to think about when choosing resilient, laminate, and wood flooring, as well as carpet and ceramic tile. Aussi disponible en français sous le titre : Les revêtements de sol

Order no.	Series no.	Title
63349	CE 46	**Fighting Asthma in Your House** Practical tips to help people with asthma improve the indoor air quality of their home. Aussi disponible en français sous le titre : Combattre l'asthme à la maison
63218	CE47	**Home Maintenance Schedule** This fact sheet provides a listing of the regular home maintenance tasks which should be done at various times throughout the year to protect the condition of your house. Aussi disponible en français sous le titre : Calendrier d'entretien de votre maison
63227	CE48	**Replacing Your Furnace** This fact sheet provides information for consumers who are replacing their existing furnace with a new one. It deals with fuel choice, furnace selection, and furnace sizing. Aussi disponible en français sous le titre : Le remplacement d'un générateur de chaleur
63235	CE 49	**Getting Your House Ready to Sell** Tips for homeowners who wish to get their house ready to sell. Aussi disponible en français sous le titre : Ce qu'il faut faire avant de mettre votre maison en vente
63436	CE50	**Avoiding Basement Flooding** Basement flooding leads to damage of the finishing material and possible growth of mold. This document reviews why basements flood and how to prevent floods from occurring. Aussi disponible en français sous le titre : Comment prévenir les inondations de sous-sol
63486	CE51	**Get to Know Your Soil** This fact sheet provides practical tips on how to analyse soil so that you can select the plants that are suited to the soil you have on your property. Once you have determined the soil conditions, it provides tips on how to amend it, if needed. Aussi disponible en français sous le titre : Apprenez à connaître votre sol
63488	CE52	**Low-Maintenance Lawns** Low-maintenance lawns help to reduce the time, costs, water, pesticides, fertilizer and energy used to maintain lawns. This fact sheet describes the benefits and provides practical tips on how to install and maintain low maintenance lawns, including species selection. Aussi disponible en français sous le titre : Les pelouses à faible entretien

Order no.	Series no.	Title
63490	CE53	**Rain Gardens: Improve Stormwater Management in Your Yard** Rain gardens are landscaped areas designed to receive stormwater and allow it to infiltrate into the soil. This fact sheet describes the benefits and provides practical tips on how to install and maintain gardens. Aussi disponible en français sous le titre : Un jardin pluvial pour mieux gérer les eaux de ruissellement dans votre cour
63492	CE54	**Understanding Your New Home Sales Contract** This fact sheet provides information on some of the terms and provisions that you may find in a new home sales agreement to illustrate what a contract can cover and an explanation why. Aussi disponible en français sous le titre : Comprendre le contrat de vente de votre maison neuve
63495	CE55	**Selecting A New Home Builder** This fact sheet provides information on how to find and what to look for and consider when searching for the right builder to build your new home. Aussi disponible en français sous le titre : Le choix d'un constructeur d'habitations
63637	CE56	**Preventing Falls on Stairs** This fact sheet tells you about some of the ways you can reduce the risk of falling on or from residential stairs. Aussi disponible en français sous le titre : Comment prévenir les chutes dans les escaliers
63730	CE57	**Efficient, Convenient Wood Heating** This is a short guide to the proper use of woodburning appliances in homes: what appliances to choose, how to operate them efficiently, what wood to burn, how to cut and store it, etc. Aussi disponible en français sous le titre : Le chauffage au bois pratique et efficace
63683	CE58	**The ABC's of Windows** This document will help consumers understand and select window performance levels with respect to airtightness, rain penetration and wind resistance appropriate for their climatic (and geographical) location and exposure conditions. Aussi disponible en français sous le titre : L'ABC des fenêtres

Order no.	Series no.	Title
63911	CE59	**Should You Test the Air in Your Home for Mold?** Testing the air in their home or apartment for mold is usually the first thing many people ask for when they suspect the presence of mold or have discovered mold growth. This fact sheet explains why air testing is not recommended, why an investigation by a trained professional is more useful and what to do if testing is deemed necessary. Aussi disponible en français sous le titre : Faut-il faire analyser l'air de la maison pour déceler la présence de moisissures?
63822	CE60	**What to Do After a Fire** Protect your health and prevent further damage to your home by following this detailed guide on the steps to restore your home after a fire. Aussi disponible en français sous le titre : Que faire après un incendie
64092	CE61	**Renovating Your Basement for Livability** This About Your House describes how renovating a full-height basement can be a relatively easy and cost-effective way to add new living space to your house. Aussi disponible en français sous le titre : Rénovation du sous-sol - objectif d'habitabilité
64064	CE62	**Lead in Older Homes** This About Your House describes where lead is found in older homes and who is at risk to lead exposure. It also describes procedures for testing lead in soil, water, paint, and dust. Aussi disponible en français sous le titre : Le plomb dans les vieilles maisons
65023	CE63a	**Accessible Housing by Design - Ramps (Large Print)** For anyone who needs to make their house accessible to someone who uses a wheelchair or other mobility device, this About Your House sheds light on the design and construction of ramps for the home. After reading this publication, you will understand how a ramp should be built, the materials that should be used and things to take into consideration before building a ramp for your home. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - Les rampes d'accès (à gros caractères)

Order no.	Series no.	Title
65080	CE63b	**Accessible Housing by Design - Appliances (Large Print)** The design of an appliance can make it very easy or very difficult to use. If you have a disability, limitations in an appliance's design can make it almost impossible to use. Using the principles of Universal Design, this About Your House will help you select an appliance by outlining important design considerations, making helpful suggestions and explaining the safety features of appliances. Aussi disponible en français sous le titre : Une habitation accessible dès la conception — les appareils (à gros caractères)
65542	CE63c	**Accessible Housing by Design - Lifts & Residential Elevators** Residential lifts and elevators can benefit many people— particularly seniors who want to remain in their homes despite a loss of mobility, strength or agility. This About Your House tells you about the types of residential lifts and elevators that are commonly available in Canada. It also tells you about some of the things you should consider when you choose and install an elevator or lift in your home. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - élévateurs et ascenseurs résidentiels
65544	CE63d	**Accessible Housing by Design - Residential Hoists and Ceiling Lifts** A residential hoist or ceiling lift can help people who have difficulty safely moving themselves or others in or out of bed, or in or out of a bathtub. This About Your House tells you about the types of residential hoists and ceiling lifts that are commonly available in Canada. It also tells you about some of the issues you should consider when you choose and install a hoist or ceiling lift in a house, condominium or apartment. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - les lève-personnes résidentiels
65588	CE63e	**Accessible Housing by Design - Kitchens** A home designed and constructed to reflect the principles of Universal Design is safer and more accommodating to the diverse range of ages and abilities of people who live in and visit this home. This About Your House discusses the Universal Design kitchen, which considers efficient design, efficiency of effort, adaptability, ease of cleaning, audibility and safety in order to provide a comfortable and safe space for all family members. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - les cuisines

Order no.	Series no.	Title
65686	CE63f	**Accessible Housing by Design: Bathrooms** A bathroom designed and constructed according to the principles of universal design should be comfortable and safe for all family members, regardless of age or ability. This About Your House outlines the design considerations and elements of a universally designed bathroom, from manoeuvring space and ease of cleaning to grab bars and walk-in bathtubs and showers. Aussi disponible en français sous le titre : Une habitation accessible dès la conception - salle de bains
65009	CE65	**Garden Suites** With municipal approval, a garden suite is a self-contained unit, set on relative's property with an existing single family house. This publication provides introductory information on garden suites for seniors or persons with disabilities. Aussi disponible en français sous le titre : Les pavillons-jardins
65527	CE66A	**How to Lock Out Crime - Home Security 101** This fact sheet walks you through an assesment of your home's current security; includes a checklist that can help you assess what needs to be improved. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile 101
65529	CE66B	**How to Lock Out Crime - Home Security - Exterior** This fact sheet gives you suggestions on how to improve security from the exterior of your home through lighting strategies and home visibility. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - L'extérieur
65531	CE66C	**How to Lock Out Crime - Home Security—Alarms** This fact sheet gives you information to help you decide whether an installed burglar alarm is the right choice for you. Two types of systems are discussed, the perimeter alarm system and the area alarm system. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les avertisseurs
65533	CE66D	**How to Lock Out Crime - Home Security - Doors** This fact sheet suggests ways you can improve your door security. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les portes
65535	CE66E	**How to Lock Out Crime - Home Security - Windows** This fact sheet suggests ways to improve the security performance of your windows. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les fenêtres

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
65537	CE66F	**How to Lock Out Crime - Home Security - Patio Doors** This fact sheet suggests ways to improve the security of one of the favourite targets of burglars: patio doors. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Les portes-fenêtres
65539	CE66G	**How to Lock Out Crime: Home Security -- Common Sense** Even if all the required bolts, hinges, latches and alarms have been installed, good home security cannot be achieved without first adopting the common-sense precautions outlined in this fact sheet. Aussi disponible en français sous le titre : Gare au crime - La sécurité à domicile - Une affaire de bon sens
65548	CE70	**EQuilibrium: Healthy Housing for a Healthy Environment** CMHC's EQuilibrium housing initiative is a powerful new movement in sustainable housing. It can help homeowners reduce their energy bills, protect their families' health, reduce greenhouse gas emissions, and keep the environment clean for generations to come. Aussi disponible en français sous le titre : Equilibrium : maison saine pour un environnement sain

ABOUT YOUR APARTMENT SERIES

Order no.	Series no.	Title
63419	AE1	**Solving Odour Transfer Problems in Your Apartment** One of the most common problems experienced by the occupants of apartment buildings is the transfer of objectionable odours from one apartment to another. Tobacco smoke and cooking odours top the list of complaints. This fact sheet explains how odours are transferred, and offers a number of potential solutions. Some are very easy to implement and others should be done with the agreement of the building management. Some are trial and error. Solving the problem can take perseverance. Aussi disponible en français sous le titre : Enrayez la transmission d'odeurs dans votre appartement
63904	AE2	**Reducing Noise in Your Apartment** This article provides basic information about the behaviour of sound and noise and suggests ways to improve the peace and tranquility in your apartment or condominium. Aussi disponible en français sous le titre : Atténuation du bruit dans votre appartement

Order no.	Series no.	Title
65013	AE3	**Dealing with Power Outages** Lengthy power outages rarely occur in Canada, but when they do, they can affect your comfort and safety. This fact sheet, intended specifically for occupants of multi-unit residential buildings, will help you plan ahead for, and deal with, power outages in your apartment building. Topics include, amongst others, contents of an emergency kit, use of alternate power, and summer and winter power failures. Aussi disponible en français sous le titre : Les pannes de courant
65050	AE4	**Fire Safety** Each year, many Canadians are injured or die in house or apartment fires. This fact sheet, intended specifically for occupants of multi-unit residential buildings, offers practical fire prevention tips and important information regarding smoke alarms. It will also help you create an escape plan for you and your family, and instruct you on what to do should a fire occur in your apartment. Aussi disponible en français sous le titre : La sécurité-incendie
65041	AE5	**Improving Your Security and Safety** This About Your Apartment fact sheet, intended specifically for occupants of multi-unit residential buildings, provides practical advice on how to protect yourself, your family, and your belongings. It highlights the types of security and safety features you may have in your building and how to use them effectively. Topics include, amongst others, proper locks for windows and doors, neighbourhood security, preventing falls from windows and balconies, combustion safety, and carbon monoxide. Aussi disponible en français sous le titre : Pour une meilleure sécurité chez soi
65297	AE6	**Dealing with Pests** Most people can relate to the surprise, shock and revulsion of coming across pests in their homes. This fact sheet, intended specifically for occupants of multi-unit residential buildings, will help you prevent and reduce infestations in your apartment by describing how insects enter homes and what they need to survive. Topics include pest proofing your apartment, Integrated Pest Management (IPM), and health concerns associated with pests and pesticides. Aussi disponible en français sous le titre : La lutte contre les parasites

ABOUT YOUR HOUSE - **NORTH SERIES**

VOTRE MAISON - **DOSSIER DU NORD**

The North About Your House series is a series specifically designed around day to day northern solutions as well as innovative northern models of building practices which work under cold climate conditions. In this series you will find examples of how to use structural panels in the high arctic, means to cleanse wastewater in the North as well as demonstrated ways of constructing a roof which can withstand northern conditions and how to choose a foundation system which will work in any of the northern communities.

Order no.	Series no.	Title
62303	North Series 1	Building with Structural Panels -- Repulse Bay
62304	Dossier du Nord	Maison à panneaux isolants de construction à Repulse Bay
62295	North Series 2	On-site Wastewater Reclamation Systems for the North
62297	Dossier du Nord 2	Installations de recyclage sur place des eaux usées dans le nord
62329	North Series 3	Snowshoe Inn, Fort Providence Co-generation Model
62330	Dossier du Nord 3	Modèle de cogénération du Snowshoe Inn, Fort Providence
62298	North Series 4	Residential Foundation Systems for Permafrost Regions
62299	Dossier du Nord 4	Fondations pour les bâtiments résidentiels construits sur le pergélisol
62154	North Series 5	Eagle Lake Healthy House
62155	Dossier du Nord 5	La maison saine d'Eagle Lake
62313	North Series 6	Arctic Hot Roof Design
62314	Dossier du Nord 6	Conception de toits chauds pour climat arctique
63050	North Series 8	How to Prevent Plumbing and Heating Vent Stack Freeze-up
63051	Dossier du Nord 8	Prévenir le gel des colonnes de ventilation de plomberie et des conduits d'évacuation de l'appareil de chauffage
63394	North Series 9	Fancoil Integrated Combination Heat and Domestic Hot Water Systems
63395	Séries du Nord 9	Installation de chauffage des locaux et de l'eau intégrée à un ventilo-convecteur

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Brief descriptions of CMHC research papers you may wish to obtain.

These research highlights are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at:

http://www.cmhc-schl.gc.ca/publications/en/rh-pr/index.html

Print copies can be obained by calling **1-800-668-2642**

Order no.	Series no.	TITLE
65843	07-123	Understanding Vapour Permeance and Condensation in Wall Assemblies
65828	07-122	Straw Bale Construction in Atlantic Canada
65834	07-120	The Effects of Programmable Fan Conrollers on Ventilation, Air Distribution and Energy Use
65684	07-117	Investigation of the Performance of Residential Electronic Filters in Actual Use
65649	07-115	Whistle Bend Planning and Design Charrette
65546	07-114	Wind-Rain Relationships in Southwestern British Columbia
65322	07-113	Sustainable Northern Development Charrette in Yellowknife
65302	07-112	Research on Green Rooftops and Walls in Québec City
65417	07-111	Field Testing of Valved Soffit Vent Performance in Protecting Roof and Attic in Strong Winds
65378	07-110	Action Plan for Sustainable Practices - Implementation Strategies for the Residential and Business Sections in the Greater Toronto Area
65365	07-109	Testing Oil-fired Appliance Depressurization Spillage
65352	07-108	Boiler Piping Study
65350	07-107	Southeast False Creek Integrated Design Process Workshops
65375	07-106	Evaluation of Water-Efficient Toilet Technologies to Carry Waste in Drainlines
65033	07-105	Performance Evaluation of Retrofitted Solid Masonry Exterior Walls
65421	07-104	High-Performance Stucco for Housing
65346	07-103	Economic Assessment of Residential Basement System Insulation Options
65295	07-102	The Effects of Reflective Interior Shades on Cooling Energy Consumption at the CCHT Research Facility
65336	07-101	A Discussion Paper: Indoor Air Quality Investigations of Houses used for Marijuana Grow Operations

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Order no.	Series no.	TITLE
65344	07-100	Relationship Between Moisture Content and Mechanical Properties of Gypsum Sheathing
65104	06-114	Old North End, Saint John, New Brunswick Community Planning and Housing Charrette
65187	06-113	Green Roofs: A Resource Manual for Municipal Policy Makers
65100	06-112	Arviat Community and Housing Design Charrette
65259	06-111	Validation of an Onsite Wastewater Risk Assessment Model
65257	06-110	Impact of Water Softeners on Septic Tanks - Field Evaluation Study
65092	06-109	Occupancy-based Classification System for Design and Construction of Residential Basements
65243	06-108	Field Assessment of a NuAir AIMS eKOCOMFORT™ Unit
65245	06-107	The eKOCOMFORT Field Assessment Program
65274	06-106	West Coast Green Roof Performance at BCIT's Green Roof Research Facility
65035	06-104	Household Environmental Monitoring - A Strategy to Help Homeowners Reduce Their Environmental Impact
64994	06-103	Identifying and Removing Pollutants from Heat Recovery Ventilators
65002	06-102	Evaluation of Air Leakage Control Measures to Compartmentalize Newly Constructed Suites in a High- Rise Residential Building
64934	06-101	Green Phoenix Integrated Design Charrette for Sustainable Affordable Housing
64958	06-100	Performance Evaluation of the Almon Street Multi-Unit Residential Building
64942	05-120	Investigating Moisture in Seasonal Housing
64940	05-119	Energy and Water Consumption Load Profiles in Multi-Unit Residential Buildings
64911	05-117	Predicting Time to Fogging of Insulated Glass Units
64913	05-116	Nunavut Research 2003-2005
64908	05-115	Study of Poured-in Place Concrete Wall Assemblies in Coastal British Columbia
64855	05-114	Reduction of Airborne Particles in Houses with Occupants Having Respiratory Ailments
64904	05-113	Duct Leakage Tests in Small Diameter Ducting System

Order no.	Series no.	TITLE
64853	05-112	Assessment of Suite Compartmentalization and Depressurization in New High-rise Residential Buildings
64806	05-111	Laboratory Depressurization Test for Residential Gas Appliances
64843	05-110	Remote Monitoring and Control of On-site Wastewater Treatment, Recycling, and Reuse Systems
63928	05-109	Initial Material Characterization of Straw Light Clay
63945	05-107	Fire Experience, Smoke Alarms and Sprinklers in Canadian Homes: CMHC Research to 2005
63669	05-106	"The Land We Live on is our Home" The 'Gameti Ko' Project Second Community-led Workshop
63876	05-105	Testing the Adhesion of Air- Barrier Membranes in Wall Assemblies
63848	05-104	Ice Damming Field Research
63836	05-103	Assessment of the Energy Performance of Two Gas Combo-Heating Systems
63838	05-102	Development of Micro-CHP Technology Assessment Capability at CCHT
63818	05-101	Effects of ECPM Furnace Motors on Electricity and Gas Use
63816	05-100	Effects of Thermostat Setting on Energy Consumption
63745	04-131	Water Reuse Standards and Verification Protocol
63741	04-130	Dry and Comfortable Floors in Existing Basements
63733	04-128	Dynamic Buffer Zone (DBZ) System Performance
63728	04-127	Comparison of Under-Floor Insulation Systems
63726	04-126	Update of Roof Truss Designs with Nailing Schedules
63641	04-125	Residential Sources of Lead
63677	04-124	Summary of Research on Water Resistive Barriers
63675	04-123	Assessing the Impact of Thickness on the Performance of Stucco Cladding
63673	04-122	Comparison and Analysis of Provincial Builder and Renovator Industry Programs
63635	04-121	Field Testing of "Spillage- Resistant" Appliances
63465	04-119	Diagnosing Attic Performance by Snow- and Frost-Melt Patterns

Order no.	Series no.	TITLE
63620	04-118	Performance of Sprayed Polyurethane Foam on Indoor Foundation Walls
63615	04-117	Analysis of Ventilation System Performance in New Ontario Houses
63612	04-116	Energy Needs and Availability in Housing
63571	04-115	Building Canada: Phase One
63555	04-114	Investigating Claims Against Home and Property Inspectors
63557	04-113	Installation Guide for Residential Wood I-Joist Floor Systems
63547	04-112	Canadian Home Inspectors and Building Officials National Initiative Phase II: Development of National Certification and Accreditation Models
63528	04-111	Characterizing the Condominium Population of the Greater Ottawa Area, 1969-2002
63540	04-110	Strategies for Reducing Building Energy Use Via Innovative Building Envelope Technologies
63511	04-109	Maximum Performance Testing of Popular Water-Efficient Toilet Models
63542	04-108	Garage Performance Testing
63503	04-107	Survey of In-Suite Space and Domestic Hot Water Heating Systems In Multi-Residential Buildings
63400	04-105	Field Testing of an Integrated Ventilation Space Conditioning System for Apartments
63413	04-104	Practical Measures for the Prevention of Basement Flooding Due to Municipal Sewer Surcharge
63407	04-103	House Dust: A Useful Tool To Assess Microbial Contamination In Homes
63390	04-102	Calgary Integrated Design and Sustainable, Affordable Housing Charrette
63365	04-101	Residential Combustion Spillage Monitoring
63376	04-100	Improved Make-up Air Supply Techniques
63382	03-134	Safe Housing for Lightly Contaminated Lands
63370	03-133	Residential Combustion Venting Failure - A Systems Approach
63374	03-131	The Canadian Residential Duct and Chimney Survey
63326	03-129	Monitoring the Performance of a Retrofitted Preserved Wood Foundation

Order no.	Series no.	TITLE
63333	03-128	Review of Hygrothermal Models for Building Envelope Retrofit Analysis
63328	03-127	Static and Dynamic Earthquake Testing of Rainscreen Stucco Systems for B.C. Residential Wood-Frame Construction
63339	03-125	Water Penetration Resistance of Windows - Study of Codes, Standards, Testing and Certification
63367	03-124	Water Penetration Resistance of Windows: Study of Manufacturing, Building Design, Installation and Maintenance Factors
63315	03-123	Integrated Community Solutions: Regina's Affordable, Sustainable Housing Design Charrette
63294	03-122	The Impact of Requiring HVAC System Design Submittal on System Performance
63280	03-121	Ventilation Systems for Multi-Unit Residential Buildings: Performance Requirements and Alternative Approaches
63243	03-119	Reduction of Air Intake Contamination in High-Rise Residential Buildings
63257	03-118	Investigation of a Ground-Source Heat Pump Retrofit to an Electrically Heated Multi-Family Building
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